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Polytechnic Club of the American Institute.

Meeting held March 16, 1871, the President (Prof. S. D. TILLMAN) read the following Notes of Scientific Progress:

I. ALBUMEN FROM BLOOD.—Albumen is now produced on a large scale, at Pesth, Hungary, and in North Germany, from the blood of animals. The serum separating when blood coagulates consists chiefly of albumen. The best quality of albumen thus obtained is transparent and soluble in water, and is used for mordanting yarns and cloth. At Pesth, blood is dried in flat iron pans, by exposure to air at a temperature of from 100° to 112° F. From 3,000 pounds of blood about 110 pounds of albumen are obtained, at a cost of $29; 16,200 eggs would yield the same amount of albumen at a cost of $96. Although the cost of egg albumen is three times as great as that of blood albumen, the former is preferred for dyeing purposes on account of its purity. Blood albumen of a second quality, darker in color but nearly all soluble in water, is used largely in the process of refining sugar.

II. A SUBSTITUTE FOR ALBUMEN IN ANILINE DYEING.—A compound of glue and tungstic acid is thrown down when tungstate of soda, hydrochloric acid, and a thick solution of glue are mixed. When heated to about 100° F. this compound is so soft and plastic that it may be drawn out into thin sheets, which become solid and brittle on cooling. This substance has been successfully employed instead of albumen in fixing aniline colors upon cotton.

Dr. VAN DER WEYDE.—This tungstate of soda is used to make woven fabrics incombustible. It is used extensively in some theatres to prepare the dresses of the dancers. It is the best thing for that purpose.

III. LITHARGE AND GLYCERINE.—M. ROST has made a material suited to a variety of purposes by mixing protoxide of lead (litharge) and glycerine so that they form a creamy liquid. In a short time the mixture becomes a hard and homogeneous mass, which readily adheres to metal and resists the action of water and steam, and is not reduced by a temperature of 527° F. It is a valuable cement, and, in the fluid state, may be used in galvano-plastic copying.

Dr. VAN DER WEYDE.—I tried that some time ago. It was recommended for stoppers of bottles; and it was so good a cement that I could never get the stoppers out any more. (Laughter.)

IV. COMPRESSED LEATHER SCRAPS.—An article in Dingler's *Polytechnic Journal* gives a process for utilizing leather shavings and scraps. They are first cleansed, then soaked in water containing one per cent. of sulphuric acid until the material becomes soft and plastic, and afterward compressed into blocks and dried by steam. In order to soften the blocks one pound of glycerine is added to 100 pounds of material; they are then passed through rollers, and brought to the proper thickness to be used as inner soles of boots and shoes.

The PRESIDENT—Leather is so cheap in this country that I do not suppose this process would be economical.

V. PEPSIN AND OTHER FERMENTS ISOLATED BY GLYCERINE.—The experiments of VON WITTICH prove that by means of concentrated glycerine, pepsin and other so-called ferments may be completely isolated. The glycerine extracts thus obtained, with but few exceptions, remain unchanged for a long time, so that a stock of ferment may be kept in store. Another advantage gained by this process is that the tissues which have thus been exhausted of their ferment are otherwise so little changed that they can be examined under conditions hitherto impossible.

Dr. VAN DER WEYDE—The value of glycerine is not as well known as it ought to be. Its applications are extended more and more every day. It is used in preparing microscopic objects instead of balsam. Anatomical preparations preserved in glycerine are not dissolved as they are in alcohol, in which they become white; and as the glycerine will not evaporate, the bottle need not be sealed up. Glycerine will not freeze at any ordinary temperature, and a little glycerine is sometimes mixed with the water in gas-metres to prevent it from freezing. Glycerine prevents fermentation. Put it in glue, and it will keep; only it will not dry. (Laughter.)

VI. ZINC COATING.—Copper and brass may be coated with zinc by immersing the article to be coated in a boiling bath of sal-ammoniac containing either sheet or powdered zinc. The zinc thus deposited is brilliant and firm.

VII. GILDING.—In treating of the characteristics of gold, in *The London Mechanics' Magazine*, Prof. DEMBINSKY says gold is so extremely ductile that a grain of it is capable of extension over an area of 56½ square inches. Gold is employed for gilding the surface of copper, brass and silver by the following different processes:—1. Hot gilding for the ormolu, the bright French gold for ornaments of all kinds; the metal to be gilded is first washed with a solution of nitrate of mercury or amalgamating water, which gives a silvery surface; to this surface an amalgam of gold and mercury is applied, from which the mercury is driven off by heat. The color is then heightened by burning it on Calder's wax, formed of wax, verdigris and blue vitriol; it is then polished and brightened by a boiling solution of common salt and cream of tartar. Some adepts heat the article on a hot iron plate provided with small apertures, and when heated apply some solution of iodine and yellow ochre with a brush. 2. German gilding of silver is performed by a solution of gold in nitric acid, to which sal-ammoniac and alembroth (a triple salt formed by salt and ammonia and corrosive sublimate) have been added. This solution of gold evaporates to the consistency of oil, and is then applied to the silver or nickel, both of which it blackens, but they appear gilded on being heated. 3. Gilding is also performed by rubbing the metal with the ashes of linen rags which have been impregnated with a solution of gold. 4. Wet gilding by merely dipping the work in a solution of gold. 5. Gilding by the well-known process of electro-plating.

Dr. VAN DER WEYDE—The ethereal solution of the terchloride of gold is a convenient means of gilding the inside of a bottle.

VIII.—DISTINCTNESS OF DISTANT SOUNDS.—Mr. C. R. MOORE, of Washington, D. C., during the first four and last three months of 1870, made a series of observations on sound, which gave unexpected results. The sources of sound were the guns of Fortress Monroe (distant about forty miles from Prospect Hill, the point of observation), and Sue's Whistle at Cherry Stone (thirteen miles distant), and at Hungar's Wharf (eight miles distant), all in a southwesterly direction from the point of observation. During the months when the intervening woods were in full foliage, the sounds were almost or entirely lost. A table, giving for forty-four observations the intensity of sound, and the force and direction of the wind, shows that sounds of maximum intensity were heard when the wind was blowing from the north, as well as from the northeast and northwest. The cause of the progress of sound against the wind is unexplained; but it is probable, that had barometrical and hygrometrical observations been also made, some clue would have been found to the cause of this curious result.

Dr. VAN DER WEYDE—I have long been looking for the results of experiments upon the velocity of sound as affected by wind.

Mr. C. B. BOYLE—It has been found, in light-house experiments, that when a cloud hangs low over the water, sound will travel much further than under ordinary circumstances.

The PRESIDENT—It may have been that clouds, in these experiments in Washington, had a good deal to do with the results obtained.

IX. ORIGIN OF GRAPHITE.—Prof. WAGNER ascribes the deposits of graphite, plumbago, or black-lead, which are found in a great variety of rocks of different geological periods, to the decomposition of cyanogen, which is a combination of carbon and nitrogen, or of the cyanides. In several chemical processes, used in the arts, graphite is formed artificially; and it is not impossible that this expensive mineral, the best specimens of which are now brought from the island of Ceylon, may be produced artificially in such quantities as to be made available in several branches of manufactures where this mineral is indispensable. Chemists, however, have not yet accepted Prof. WAGNER'S explanation, or any other, as to the natural production of graphite.

Dr. VAN DER WEYDE—I think that idea must be taken from a preconceived notion; for carbon is not found to any great extent except in the animal or vegetable kingdoms. The amount of carbonic acid in the air is so enormous, that if all the mineral coal in the whole world were burned up, the proportion of carbonic acid in the atmosphere would only be increased to a very small extent. Philosophers generally ascribe all forms of carbon to vegetable and animal life, which in geologic ages have been transformed into coal and other substances containing carbon. Coal is derived from vegetation. Petroleum is a hydrocarbon derived from the remains of animals, chiefly molluscs, and perhaps to the greatest extent microscopic ones. It has been suggested that the diamond, which is pure carbon, is of vegetable origin; and it has been asserted that remnants of vegetables have been found inside of diamonds. Grey cast iron contains graphite diffused through the mass; so that it is rich in carbon.

X.—KAOLIN.—Dr. C. BISCHOF describes in DINGLER'S *Polytechnic Journal*, a series of experiments made with porcelain clay from ten different localities, his object being to determine the value of these various kinds of kaolin by means of a pyrometrical method. The standard sample was the levigated kaolin from Zettlitz, Bohemia. This consists, in 100 parts, of alumina, 38.54; chemically-combined silica, 40.53; silica, as sand, 5.15; magnesia, 0.38; lime, 0.08; peroxide of iron, 0.90; potassa, 0.66 (loss by ignition (13.00). This sample, in powder, was compressed into the shape of small cylinders, and then heated to the temperature of the melting point of platinum by itself. After carefully examining the effect of this ignition, a flux of from one to two-tenths of the weight of the kaolin was added, and the cylinders were again subjected to the same high temperature. In the same manner, the several samples from other localities were tested.

XI.—UTILIZATION OF SEWAGE.—A novel method of sewage purification and utilization has been devised in England by Dr. APSLEY PRICE and DAVID FORBES, F. R. S. It is founded on the fact that certain mineral phosphates, easily obtainable, especially those containing alumina, when in a hydrated or freshly precipitated state, eagerly combine with the organic matter contained in sewage, it being sufficient merely to agitate them in the most fetid sewage to deprive it of all its odor and color, even if tinctorial substances of great intensity be present in the solution at the same time; while the phosphate of magnesia combines with the ammonia contained in the sewage, and precipitates it also in the state of the double phosphate of ammonia and magnesia. The precipitate subsides rapidly, and the remaining water is quite transparent and colorless; it is also nearly tasteless, and can with safety be drawn off and discharged at once into the nearest natural stream. The process is an extremely simple one, and requires nothing beyond an ordinary reservoir for holding the sewage during the operation. The phosphates are preferably added to the sewage in solution, in sulphuric or hydrochloric acid, and their precipitation in the hydrated form, along with the organic matter in the sewage, and more or less ammonia (dependent on the strength of the sewage, and length of time it has been allowed to stand), is instantaneously effected by the addition of a small quantity of milk of lime, just sufficient to neutralize the acid which holds them in solution. The use of the natural phosphate of alumina is especially recommended.

Dr. VAN DER WEYDE—This is a very important paper. Alumina is the agent used in precipitating many things which are dissolved in water—coloring matter, for instance. That is the way madder and other lakes are made. A solution of alum precipitates the coloring matter. At New Orleans, alum is used to purify the water from the Mississippi river, in the manufacture of ice. It is not surprising that the phosphate of alumina will do the same thing as alum, which is a sulphate of potash and alumina, and precipitate organic matters in suspension and solution. The precipitate must be valuable, because good soils must contain alumina and phosphates. The most fertile soils contain the decomposed remains of feldspar, which is chiefly alumina and silica, and is similar to common alum. This is a very happy idea, by this means to get rid of the bulk of the sewage, and to secure the most valuable ingredients, while adding to them a substance which will increase their value for fertilization.

XII.—DRYING RETARDS DECOMPOSITION.—Prof. A. W. WILLIAMSON, of London, has recently delivered a series of lectures on fermentation, from one of which the following is condensed. All processes of fermentation are accompanied by moisture. The little organisms which cause fermentation are soft and wet; moisture constitutes a great part of their substance, and in a dry medium they cannot live. Applications, therefore, of a mere drying process are among the most important and interesting of this class of agencies. Germs of putrefaction or decomposition may be present in fruit, but if you merely take away the greater part of the moisture, you render the substance incapable of decomposing. Among the agents which serve for that purpose, there are some which abstract the water, not in a state of vapor, but in the liquid state. If you put a piece of fresh meat in contact with salt, or rub it over with salt, the salt gradually absorbs the water. The action is truly a drying action upon the meat, and it is effectual. In like manner it is known to many persons that sugar is used just as salt. It is said that ordinary jam—fruit and sugar which have been boiled together for some time—keeps better if the pots into which it is poured are tied up while hot. If the paper can act as a strainer, in the same way as cotton-wool, it must be as people suppose. If one pot of jam be allowed to cool before it is tied down, little germs will fall upon it from the air, and they will retain their vitality, because they fall upon a cool substance; they will be shut in by the paper, and will soon fall to work decomposing the fruit. If another pot, perfectly similar, be filled with a boiling-hot mixture, and immediately covered over, though, of course, some of the outside air must be shut in, any germs which are floating in it will be scalded, and in all probability destroyed, so that no decomposition can take place.

Dr. VAN DER WEYDE—The same theory applies to glycerine; for that preserves by extracting water. The preserver of water is a necessary condition of fermentation. But we cannot destroy the germs by the mere extraction of water. We can only arrest their germination; and when water is again applied, the germs will develope. Some animalcules, especially the rotifera, have such a strong tendency to be revived, that they have lived after having been dried fourteen times and kept fourteen years. Some germs are not killed even by hydrocyanic acid. It is necessary to shut off the air from anything we wish to preserve, for the air is full of germs, ready to develope the moment they have an opportunity. But there is no such thing as spontaneous generation.

SEA CURRENTS.—Dr. CARPENTER read a paper at a recent meeting of the Royal Geographical Society of London, in which he gave an account of observations of the Gibraltar currents, made during a recent cruise of the British ship Porcupine. The chief point enunciated, was that there were special local circulations in the Mediterranean and other inland seas. The immense evaporation over the surface of the Mediterranean produced the in-current of salt water, the evaporation increasing the density of the Mediterranean water, which flowed out through Gibraltar at a lower level near the bottom. The fresh water running into that sea floated on the top, but did not equal the loss by evaporation. There was thus an excess of salt, and, consequently, an excess of weight, per height of column, of the inland waters over the oceanic waters without; this increased gravity produced pressure, and the pressure caused the outflow. The experimental researches were stated in detail which confirmed this theory. The existence of an undercurrent in the Strait of Gibraltar is said to have been first proved by a sea-captain, by means of a rope attached at one end to a small boat, and at the other to a basket of stones sunk to a considerable depth. The basket of stones was acted upon by a strong outflowing with such force that the boat was towed out against the inflowing surface current. The converse took place in the Baltic and Black Seas. According to Dr. CARPENTER'S theory, similar in result as to general oceanic circulation was the effect of cold at the polar, and heat at the equatorial regions. The action of cold on salt water was different from that on fresh water. The salt water became denser and heavier with the cold up to the point of its solidification, which was at a much lower temperature than 32° Fahr. Consequently there was a contraction and a downward motion of the sea water at the poles. On the other hand, there was an expansion and an uprise of the sea water at the equator. These two actions produced an outflow of a cold stratum in the lower depths from the polar regions and an inflow of the warm surface waters from the equatorial hot regions. This theory was illustrated by a very pretty experiment in a glass trough with a heated surface at one end and a wedge of ice at the

other. Blue and red pigments were let in to show the motions of the liquid. The red cloud travelled in one direction and the blue cloud in the other. This ocular demonstration was very convincing.

Dr. Van der Weyde—The current on the surface at the Straits of Gibraltar has long attracted attention, because it was difficult to understand why there should be such a current, when there are the Nile and other rivers flowing into the Mediterranean Sea. They have taken great pains to find a lower current running into the ocean to explain that; and now it seems they have found it. But when we take into account the evaporation, that explains it all. When we look at the map we see how large the Mediterranean Sea is, in comparison with the surface of the land drained by it, and how few rivers flow into it. We see that the Caspian Sea has a much larger river running into it, has a smaller surface and a colder climate; and yet evaporation there is sufficient to keep its surface 80 feet below the level of the ocean. The Mediterranean has so small an amount of land to drain, and has so large a surface for evaporation, that the water must flow in, as it does at the Straits of Gibraltar, and also from the Black Sea which receives more water than it can evaporate. That is the whole explanation. The salt water in the ocean comes from the rivers, and the ocean gets salter and salter all the time. There is no river which carries pure water into the ocean. They always have substances in solution, but the water evaporating from the ocean is pure rain water. The Amazon carries into the ocean forty million of tons of solid matter every year. All the rivers are hard water, to a greater or less extent; and even Croton water contains more salt than rain water. The ocean for millions of years has been receiving all the impurities of the whole earth, and giving back pure water; and it is no wonder that the water of the ocean is salt. The salt flows into it and cannot get out. Our Salt Lake, which has no outlet, is a perfectly saturated solution of salt, containing two or three times as much salt as ocean water; and the Caspian Sea is nearly saturated.

The President—The Dead Sea is a thousand feet below the level of the Mediterranean Sea; but the evaporation is so great that the level is kept down.

Mr. ——— suggested that the rotation of the earth might have some effect upon the current through the Straits of Gibraltar.

Dr. Van der Weyde stated that in geologic epochs Spain was connected with Africa and England with France, and at that time the Desert of Sahara was an ocean.

Mr. Robert Weir—Is it a fact that the surface of the Desert of Sahara is lower than the level of the surrounding ocean?

Dr. Van der Weyde—It has been asserted; but it has not been proved, and I do not believe it.

The President read the article again.

Dr. Van der Weyde—I know that in a trough of water, the the heavier water may go one way, and the lighter the other way. But in the Mediterranean I know positively that the evaporation must be considerably more than the supply, and therefore water must flow in.

The President—How do you account for the outflowing undercurrent?

Dr. Van der Weyde—It must be insignificant. It is a new discovery. The top current is very strong all the time.

Mr. Boyle—I think it is a mistake about its being a new discovery. There is a statement that a Dutch brigantine, loaded with salt, in the early Napoleonic wars, sunk there; and after the salt was dissolved, she rose and was found thirty miles further out, upon the Barbary coast. It was then concluded that she must have been carried out by an undercurrent.

Mr. William H. McAlpine—I had occasion some years ago to ascertain the amount of evaporation from the surface of the water in this State, and it amounted to about five feet per annum. I have had frequent occasion, in the course of my profession as a civil engineer, to make similar investigations in other places; and I have found the evaporation, further south, to amount to seven or eight feet per annum. The surface which drains into the Mediterranean Sea has a superficial area three or four times as great as that of the sea itself, and no current into the Mediterranean Sea can take place, according to my idea of it, from mere evaporation. There must be some other cause.

That this outward current exists, is doubtless true. There is a circulation of water going on, not, I think, due to the excessive evaporation from that particular sea, but due to other causes. Call the evaporation six feet, or seven if you please. Then calculate the area which sheds its water there, with a rain-fall of thirty to forty inches, and you will find the drainage to amount to perhaps twice the amount of the evaporation.

The President—It is a singular circumstance with regard to the Mediterranean, that on the south there is no river but the Nile discharging into it; and that from the south there is a constant hot wind. from the Desert of Sahara, blowing over the sea, absorbing an immense quantity of moisture, and producing a sensible effect up in Central Europe. Probably the evaporation from the Mediterranean Sea is greater than anywhere else in the world.

Mr. McAlpine—Along Lake Erie the water-shed on the south side is only fifteen miles in width, while on the north side it is one hundred miles or more. At Lake Michigan it is the same. It is a curious fact that in many places we find the quantity of water flowing north very small, and that flowing south very large. There is an immense area of country north of the Mediterranean, which empties directly or indirectly into it, and no evaporation can account for it.

Dr. Van der Weyde—I think it fully accounts for it. The water in the rivers flowing into the Mediterranean is very little. The water-shed of the whole Mediterranean is only about double its surface.

Mr. McAlpine—It is quintuple, I should judge.

Dr. Van der Weyde—I invite the gentleman to look at the map. They are all insignificant rivers. The only large river is the Nile, and that only for a short season of the year. There is not a single river so large as the Volga, and that is wholly absorbed by the Caspian Sea.

Mr. McAlpine—The Danube.

Dr. Van der Weyde—That flows into the Black Sea; part of it is evaporated, and the remainder flows through the Bosphorus and the Straits of Dardanelles into the Mediterranean. But it amounts to less than the evaporation, helped a little by Etna and Vesuvius, and there must be a current inward from the Atlantic Ocean.

The President—How do you account for the outflowing current?

Dr. Van der Weyde—It must be less than the inflowing current. The evaporation is enormous, and it must be balanced with the rain-fall, or there must be a supply of water from some other source. People used to think there was a subterranean outlet from the Caspian to the Black Sea, to account for the water of the Volga not raising the level; but we find that the Black Sea is eighty feet higher; so that if there were such a passage, the water would flow from the Black Sea into the Caspian. The result would be that the Caspian Sea would have double the surface, or more; and then the evaporation from it would be doubled, and then the evaporation would again balance the amount of water flowing in.

Dr. Bradley—Lieut. Maury, in his Physical Geography of the Seas, states that the evaporation from the ocean has been estimated at nine feet per annum. I have had occasion to investigate the subject, and I have satisfied myself that that is not far from correct. The evaporation from the whole surface of the ocean, at that rate, would amount to over 2,000,000,000 tons of water every minute of time.

Mr. McAlpine—The question of evaporation and water drainage resolves itself into plain common sense questions. All the fresh water we find upon the surface of the earth, comes from the clouds, and is evaporated from the sea. We have therefore the measure to know how much has been evaporated. All that has gone up must come down. The rain-fall we may consider here about three feet; but in the East Indies it will amount to ten feet. In any particular district of country, the evaporation and the rain-fall must balance each other. It is a remarkable circumstance that at Mackinaw Straits, the government engineers report that the flow of water is always towards Lake Huron. In other words, the evaporation from the surface of Lake Michigan is insufficient to carry off the water that comes in.

Dr. Van der Weyde—Do you conclude that the Mediterranean receives more water than it evaporates?

Mr. McAlpine—I think it does. Warm air absorbs a large amount of moisture; but it is like a sponge, and as it passes over the land, and diminishes in temperature, the moisture is precipitated; it is like squeezing a sponge; and so more and more is precipitated, until it reaches the top of the mountains, when it is entirely precipitated. It flows back through the water-courses towards the ocean, and it is again evaporated.

Dr. Van der Weyde—The evaporation and the rain-fall balance each other, of course; but we must take the whole surface of the earth. Compare Kansas and Alaska. In Alaska, there are only thirty days in the year when no rain falls, and it is so cold a climate that there is little evaporation. Therefore the rainfall there must be larger than the evaporation; while in Kansas and Colorado we know that the rainfall must be much less than the evaporation.

Mr. Boyle—In the case of the brigantine, she must have been in the upper and under current nearly an equal length of time; so that the under current must have been greater than the upper current.

The President—It is important to have the means of ascertaining directly the relative amount of moisture in the air at any given degree of temperature. It would solve a great many questions still remaining in doubt. I have had an instrument for that purpose under consideration, and shall soon present it here.

Mr. McAlpine—I have now under consideration the ventilation of the capitol at Albany, of which I am engineer. The question of ventilation includes something more than heating and cooling the atmosphere in the two chambers. We must take into account its hygroscopic condition. In laying the foundations of the capitol, which are now done, I have prepared for that precise thing. I have chambers, one to warm or cool the air, another to add moisture to the air or to deprive it of moisture, and another to give pressure or attenuation to the air. I propose that the attendant engineer shall know by the hygrometer the amount of moisture in the air, and shall regulate it. And so with regard to the pressure, which it has been suggested will be sometimes very convenient. If a tedious man has the floor, all the Speaker will have to do will be to signal to the engineer to attend to the air, and instead of speaking an hour, he will subside in ten minutes; or if a measure is to be carried, the engineer puts on the pressure, the debate becomes eloquent, those who listen are interested and convinced, and the work is done. (Laughter.)

The President—In the hygrometers now in use, we determine the actual amount of moisture in the air, and to ascertain the amount which we should have for a given temperature, we must make a calculation. What I propose is an instrument to show without calculation or tables the amount of moisture due to the temperature. For instance, if the temperature is 70°, the instrument will show how much moisture must be added to or withheld from the air to produce the proper moisture for that temperature. We can say there are 10° of moisture required, just as we look at the thermometer and say there are 10° of heat required to produce a comfortable and healthful temperature.

Mr. ——— inquired whether there was a constant level of water beneath the surface of the earth.

Mr. McAlpine—As I stated a little while ago, all fresh water comes from the clouds. If you have a spring of fresh water, you may be sure it comes from some point of ground higher than that at which it issues. On Long Island there is a peculiar formation of country. The south portion of the island is entirely sand, gravel and porous soil. About twenty years ago, I took lines of levels of every stream and well running from the ocean northward, and discovered a remarkable fact, viz., that the water slope descended at the rate of about six feet to the mile, sometimes more and sometimes less; so that it is possible to determine within about a foot how deep you will have to sink a well to reach fresh water, by reaching this sheet of water which is flowing down to the ocean. Within fifty miles of Fulton Ferry, we can find more water than is necessary to supply the city of London. By actual measurements, I found that there was a supply of seventy-five millions of gallons daily within fifty miles of Fulton Ferry. We must anticipate the water as it flows down towards the ocean. The fresh water flows over the salt water, which you would find if you were to dig deeper.

Amalgamated Copper Plates.

By N. S. Keith, Esq.

The discovery of the utility of amalgamated copper plates in the treatment of auriferous rock in the stamp mill has so simplified and cheapened the metallurgy of gold, that it is now profitable to mine and reduce many gold-bearing ores and rocks that formerly would not pay the necessary expenses of manipulation by the old processes of amalgamation in arastras, Chilian mills, amalgamators, barrels, etc. By the aid of the plates, in a majority of cases it is made unnecessary to submit the ore to a separate and distinct amalgamation after the operation of pulverizing, with all the attendant expenses of handling, loss, wear and tear of machinery, power, loss of quicksilver, etc. Instead, the amalgamation takes place in, as it were, the same apparatus which effects the reduction, and in a practical and effectual manner. This is the case, of course, after the gold is freed from its matrix. These virtues are not claimed in the case of ores in which the gold is mineralized (if there are any such) or covered by substances which prevent the contact with quicksilver.

The principal difficulty with which the millman has to contend, is the discoloration of the surface of the plate by oxides or various insoluble metallic salts, when it is so necessary to keep it bright and free from any film or covering preventing the easy and sure contact and adhesion of the particles of gold and amalgam as the pulp passes over. A new plate, then, is not considered in "taking condition" until it will remain bright for at least some hours without "dressing." With most plans of preparation this desideratum is not attained before a firmly adhering layer of gold amalgam has attached itself to the plate, which usually takes place after the loss of much gold, labor and time. Silver-plated, and even gold-plated copper plates have been used, but have not met with much favor, either from being ineffectual or too expensive. The following described plan of preparation and treatment I have found most effective, and at the same time inexpensive, as compared with silver-plating.

Composition plates made of copper, with a small quantity of zinc, have been used. Though they are very easily kept clean and are effective they have been found too expensive as they are easily broken. Their brittleness is caused by the union of the quicksilver with the zinc alloyed with the copper.

The conditions necessary to be observed in the preparation and care of amalgamated copper plates, that they may be put and kept in most effective order, are these: Quality of copper; method of amalgamating the plate; method of "dressing" the plate; purity of mercury; purity of water; character of ore or rock. In selecting the plate, take only the purest, softest copper, free from dark, rough spots of iron, etc. The quality known to the trade as "braziers' copper" is the best from which to select the pieces. Do not take that which has been rolled with special care to make the surface smooth and hard, as that will not absorb the quicksilver so well as the softer and consequently more porous. It is best, for efficiency and durability, to select plates weighing not less than three pounds to a square foot; thicker is better. For inside plates use that which is two or three times as heavy, as not being so easily bent and torn from position. If possible, buy copper which has been annealed subsequently to the last rolling. If not, then anneal the plates by exposing them to heat on the under side, sufficient to ignite sawdust laid upon the upper side. This may be done over a blacksmith's fire, but more handily over an open fire of wood or charcoal. Be sure to subject every part of the plate to the heat. This will soften the plate, making it more porous, and consequently capable of retaining more quicksilver and amalgam than it otherwise would. As the efficiency of copper plates is in proportion to their ability to hold quicksilver, this point must be carefully attended to. After this, straighten the plate by laying it on the table and using a wooden block and hammer. Do not strike with the hammer directly on the plate, but interpose the block, so that the face of the copper may not be compressed or drawn out of shape. Fasten then to the table with iron screws, or, preferably, copper nails long enough to clench on the under side of the table. In either case, have the heads of screws or nails flush with the face of the plate. Do not use brass screws, as quicksilver soon penetrates and makes brittle the heads, so that they will not hold. The minor inequalities may now be removed by the use of the block and hammer.

Next scour the plate with wood ashes and fine sand or tailings, using a scrubbing-brush or coarse rag. Bad spots may be scoured with the ashes and sand, and the end of a small

block of wood. Continue the scouring until the coating of oxide is entirely removed, and the bright, metallic copper exposed. Caustic soda, the concentrated lye of the shops, or sal soda, may be used instead of ashes, the object being to remove all traces of oil or grease by action of alkalies. After washing with clean water, apply with a soft brush, or swab, a solution of cyanide of potassium, say one-half ounce cyanide to one pint of water. The plate may be readily amalgamated by the use of the following mixture: Fine sand or tailings, powdered sal ammoniac, equal parts, and containing a small quantity of quicksilver sprinkled therein. With the scrubbing-brush and this mixture, continue the scrubbing until all parts of the plate are amalgamated. During the operation, sprinkle on the plate as much quicksilver as the plate will absorb, and water enough to make a thick mud of the mixture. I have used lime with this mixture, but cannot say that the addition is of any special benefit. It is unpleasant, to say the least, as ammonia is set free in great quantity. Allow this mixture to remain on the plate for an hour or so, and then wash it off with clean water, and the brush. Follow with the soft brush and cyanide solution, adding quicksilver, if the plate will hold it. By continuing this treatment for three or four rounds, the plate will be found to have taken up or absorbed as much quicksilver as ordinarily after many weeks running. If fine gold amalgam can be spared, it is well at this stage to rub some upon the plate, using a cloth rubber wetted with a solution of sal ammoniac, in the proportion of four ounces to the pint of water. If the amalgam be heated, and rubbed in a wedgewood mortar, so as to insure the solution or minute diffusion of the gold, it will be the more readily attached to the plate. I have used silver amalgam in the place of gold amalgam, with excellent results. Silver amalgam can be made as follows: Dissolve a piece of silver, coin, will answer, in the smallest possible quantity of dilute nitric acid. Heat will hasten the solution. Dissolve the resulting crystals of nitrate of silver in water, and pour into the vessel enough quicksilver to reduce and amalgamate the silver in the solution. This reaction will be completed in a few hours. Wash the amalgam with clean water, to remove all traces of nitrate of mercury, and strain to remove the surplus quicksilver, leaving in the cloth a pasty amalgam of very pure and finely divided silver. Use this as directed for the gold amalgam.

The *rationale* of this plan of treatment may be stated as follows: The first scouring removes oxides and grease, exposes the pure bright metal which by the annealing has been rendered capable of holding a comparatively large quantity of quicksilver and amalgam by virtue of its porosity. The sal ammoniac, by reason of its property of dissolving oxides, assists the amalgamation by keeping a bright metallic surface, allowing the quicksilver and amalgam to penetrate the copper, filling the minute interstices, and combine in atomic proportions so as to form an alloy of copper, gold and quicksilver. Thus the air, water and various salts are kept from acting directly upon the copper, preventing the formation of oxide and carbonate of copper to coat the plate. This is accomplished in a longer or shorter period, depending upon the mode of preparation and upon the richness of the ore and the ease with which the gold in the ore may be amalgamated. It is probable that the galvanic current due to the contact of two dissimilar metals plays an important part in influencing the chemical reactions and assisting the amalgamation of gold, but as its exact action is not defined it is needless to discuss the point in this article.

The point aimed at in this plan of preparation is to hasten the union of a sufficient amount of gold and quicksilver with the copper. If allowed to take place slowly, the unavoidable loss of gold makes the expense much greater than if forwarded by the use of the needful amount of amalgam before running any ore over the plate. If an old well-used plate be cut or broken the amalgam will be found to have penetrated perhaps half, and in some cases completely through the copper.

Corrosive sublimate, nitrate of mercury, sulphuric acid, sulphuric acid and common salt, muriatic acid, sodium amalgam, cyanide of potassium, and other acids and salts, have been used in amalgamating copper; but though the amalgamation may be accomplished in some cases quite easily, the plate cannot be brought to a good working condition so soon, if at all, as in the way described.

The subsequent treatment of plates amalgamated as described should be varied to suit the circumstances of kind and quality of ore, and purity of water. Water containing carbonic acid discolors plates readily, forming an insoluble coating of carbonate of copper. Though an infinitely thin film, it is sufficient to prevent the contact and adhesion of gold and amalgam unless in particles sufficiently large to break the coating. The worst form of discoloration of plates proceeds from the action of sulphates of iron and copper present in many ores from the natural decomposition of the pyrites. The addition of lime to the water introduced to the battery, as much as will dissolve therein, will neutralize the carbonic acid, and decompose the sulphates. It may be necessary to add lime to the ore to furnish enough to react on all the sulphates.

When the mill is in operation the plates should be "dressed" every six hours, or oftener should they become discolored. After stopping the mill and washing the plates with a stream of clear water, apply with a soft brush (a white-wash brush is handy) some of the solution of sal ammoniac. Allow the sal ammoniac to remain on the plate a few minutes, wash with clear water and apply with the brush enough of the solution of cyanide potassium to brighten the plate. The plate should have upon it as much quicksilver as it will hold without gathering in drops, or running off. Experience in this matter will teach the niceties of manipulation to the millman.

It is essential to use quicksilver entirely free from "base metals," such as lead, zinc, tin, copper, etc. The presence of gold and silver, is, of course, desirable. The base metals when combined with quicksilver oxidize very readily, especially when the amalgam is finely divided, exposing a large surface to the action of water, air, and other oxidizing agents. Thus, with impure quicksilver the coating on plates may arise from the amalgam instead of the copper itself.

To test the purity of quicksilver, put a small quantity on a sheet of paper while dry; if when moved upon the paper by inclining it in various directions a film adhering to the paper is left on the track, the quicksilver is impure. Another test: Put a half an ounce or so in an ordinary iron "gold pan," and by a quick up and down jerk separate the mercury into small globules; if, on inclining the pan, they do not readily run together, the sample is impure. To purify, first retort the quicksilver and add to it after retorting a few ounces of dilute nitric acid, (acid 1 part, water 3 parts.) An ordinary acid bottle is a handy vessel to hold the mercury and acid, as it may occasionally be agitated to hasten the purification by bringing the acid in contact with the impurities. The acid, by reason of its greater affinity for the base metals, removes them by forming nitrates. The chemical details I need not enter into in this article. Some days may elapse before the quicksilver becomes purified. Samples may be tested from time to time by the plans I have mentioned. Before using the quicksilver it should be repeatedly washed with water to remove all traces of nitrates. It is a good plan to keep a supply of quicksilver under treatment, putting all which has been used into the bottle, and drawing from it such an amount of purified as may be wanted.

A stock of needful chemicals should be kept at the mill. The following list comprises those necessary for the preparation and treatment of plates and quicksilver: Cyanide of potassium (fused), sal ammoniac (powdered), caustic or unslacked lime, caustic soda or "concentrated lye," and nitric acid, (commercial acid is sufficiently pure.) Cyanide of sodium may be substituted for cyanide of potassium; common salt for sal ammoniac; wood ashes, or the lye therefrom, or sal soda, for the lime and soda, and sulphuric acid and saltpetre for nitric acid. These substitutes are but "makeshifts" at best, and consequently should not be used when the others are at hand or can be procured. It is well to keep ready prepared the solutions of sal ammoniac and cyanide of potassium in well stoppered bottles. The cyanide solution being especially liable to decomposition, should not be prepared in large quantities at a time. It should also be carefully kept and labelled as *poison*, to prevent accidents.

Boards of Arbitration.

Philadelphia, March 25, 1871.

To the Editor—Sir: As the Judiciary Committee of the State of Pennsylvania have recommended arbitration and conciliation as a means of settling the present difficulties in the Anthracite Coal Regions, and as I have devoted some attention to this question, I beg leave, though an operator, to offer for publication a few suggestions as to the best method of practically applying the above recommendation.

If the parties to the dispute should agree to try this system of settling it, I would recommend the selection of three local *Boards of Arbitration*, one for the Schuylkill, one for the Lehigh and one for the Wyoming region. Each Board should consist of say twelve (12) persons, six selected by the workmen and six by the operators; each party should be free to choose their delegates as they please. As soon as such selection had taken place, the members of the Board would meet and proceed at once, before any question in dispute had been discussed, to the selection of an umpire, who should be well known to both parties as a man of ability and integrity, not connected in any way either as workman or employer with coal mining.

These three local Boards should each select four of their number (two workingmen and two employers) as delegates to a general Board for the entire trade of the regions, the functions of which will be considered further on.

Each Board should then proceed to discuss and settle all questions of interest to the region it represents alone, such as the basis price of coal, the price to be paid per ton for mining, per yard for gangway, etc.

At the first meeting for settling the present difficulty, each party should present in writing for consideration the terms upon which they are willing to resume work; and, after both propositions have been read, and the differences between them noted, the Board could take up the points upon which the two parties differ and endeavor to settle them amicably, with the distinct understanding that, if they are unable to agree upon any question, it shall be referred to the umpire for his decision. If such should be the case, the umpire would then be sent for, and each side would present their statement of the case to him. He would, of course, endeavor to harmonize the views of the contestants by pointing out what he considered to be wrong in the arguments used by each party.

If, however, conciliation should fail, he would be called upon to give a decision, which would be final and binding upon both parties. When all existing disputes have been amicably arranged in this way, the Board could proceed to appoint certain days for holding regular meetings; for example, the first Monday in each third month, at which all subjects likely to result in trouble or disputes could be settled before they became of sufficient importance to cause a strike.

The votes of at least two-thirds (four) of each party should be necessary to decide any question presented to the Board. Sub-committees, consisting of two workmen and two employers, should then be appointed; to one of these committees would be referred the determination of the monthly price of coal; to another, all disputes between individual operators and their men, which they are unable to settle themselves. In case of non-agreement of a committee, the matter would be referred to the Board. Should either party to a dispute be a member of the sub-committee having charge of that question, his place would be temporarily filled by another member of the Board.

The general Board for the whole trade would consist of six workingmen and six employers, selected, as above-mentioned, by the local Boards, whose function would be to consider all questions of interest to the three regions in common. The most important, perhaps the only subject which would come before them at the present time, would be the determination of the exact relation of the workmen to their employers, involving the question of the interference of the former in the management of the works. Though this Board would meet but seldom, yet the questions presented to it would be of vital importance to the prosperity of the anthracite coal trade, and to the general welfare of the workingmen themselves.

Yours very respectfully, Eckley B. Coxe.

Canadian Iron Production.

St. Maurice Forges, March 27, 1871.

To the Editor: Sir—Your paper of the 7th instant contains a review of "Canadian Mining for 1870," taken from the Montreal *Herald*, in which a misstatement occurs that I wish to correct through your columns.

Under the heading "Iron," it is stated that the St. Maurice Forges belonging to Messrs. John McDougall & Sons, of Three Rivers, "were partially suspended, owing to the removal of some of their works further back into the country." This is totally wrong. The furnaces in question have been in constant operation for seven years past yielding always more than double the quantity of pig iron produced at either of the other two works mentioned by above authority as enjoying such a high degree of prosperity.

This statement, manifestly incorrect to Montreal readers, could do little harm by its publication there; but now that it has received more distant circulation, I am anxious to make an explanation. I am sir, yours respectfully,

Robert McDougall, Manager.

The Toughness of Iron and Steel at Different Temperatures.

Jersey City, March 30, 1871.

To the Editor: Sir—With regard to the toughness of iron and steel at different temperatures, respecting which you have published the conflicting opinions of some celebrated experimenters—Fairbairn and Joule among others—the facts are that both opinions are right with respect to some kinds, and both are wrong respecting other kinds, or rather qualities, of those materials. The best specimens of iron and steel are generally found to be strongest at low temperatures; and inferior qualities are usually found to become tougher and their longitudinal strength increased as their temperature is raised until it reaches 500° or 600° Fahrenheit.

The garden nails mentioned are small-sized wrought nails; and as they are drawn under the hammer it is necessary that the iron employed in the manufacture should be of at least tolerably good quality; and this will also be somewhat improved by the action of the workman's hammer. J. D. W.

Application of Compressed Air to Mining.

The most successful application of the pneumatic or compressed air principle in the performance of the mechanical work in coal mines is now to be seen at the Holmes Colliery, near Rotherham. Mr. Philip Cooper, the well-known mining engineer, and manager of the colliery, has for some considerable time been engaged in making a series of experiments in order to ascertain the extent to which the compressed air system could be applied. He has been so far successful that water is now being pumped from the pit and coal hauled along the tramways by means of power obtained from compressed air. The air is compressed on the surface by a double-cylindered steam engine, with 18 inch cylinder and 3 feet stroke, with two air compressing pumps, 20 inches in diameter and 3 feet stroke, worked direct from the steam engine. Near this steam engine is placed a large air receiver, while corresponding with this in the mine, at a distance of nearly one mile, are three receivers connected by short cast-iron pipes, so as to form one, this plan being found necessary in order that the receivers could be made on the surface, and connected in the pit without riveting, as safety-lamps are exclusively used at the colliery. At this part of the mine also is an air engine with two cylinders, each 14 inches in diameter, with a 12-inch stroke, working two double-acting force pumps 5 inches in diameter, with a 12-inch stroke. The compressed air is conveyed from the compressing engine on the surface to the air engine in the mine in 7-inch cast-iron pipes. The discharge pipes of the pumping apparatus worked by this compressed air are 5 inches in diameter and nearly 1000 yards long, having a vertical lift of nearly 100 yards. The apparatus was first worked on the 6th January last, and the steam engine was worked at the rate of fifty strokes per minute, a uniform pressure of 25 lbs. per inch being maintained for eight hours at the surface and at the underground receiver. The air engine was worked during that time at the rate of fifty strokes per minute, 160 gallons of water per minute being raised. Since that time, the results have been even more satisfactory, the apparatus working in a better manner than was anticipated.

Encouraged by this success, Mr. Cooper turned his attention to adapting the compressed air-system to the hauling of coal, it having, hitherto, been found impossible to accomplish this kind of work by water power, and steam having also failed, through the great difficulty experienced in economically conveying it long distances, or safely placing steam boilers underground. After a variety of experiments, a successful result was again obtained, and coal is now daily being hauled by means of power supplied by the air engine. Many experiments have been made in various parts of the country to apply

this principle of working by compressed air in coal mines, the result, in the majority of cases, being that it was found that a loss of about 75 per cent. of the power was sustained in the transmission of the air from the compressing engine on the surface to the air engine in the mine. Mr. COOPER has ascertained that this loss of power arose from the fact of the pipes employed to convey the compressed air being of much too small diameter, and the result of his experiments has convinced him that, with a sufficiently large air pipe, a power equal to one hundred horses can be very economically transmitted to a distance of one to one and a half mile, where it can be used for all the purposes to which steam and horse power is generally applied, such as pumping water in the dip workings of the mine, working coal-cutting machinery, lifting or hauling coal, in tramming it along the ordinary bank levels or ends. Another advantage is, that when not needed, the compressed air, unlike steam or water, can be allowed to escape into the workings of the pit, with a result beneficial rather than otherwise. Nor need the principle be confined to coal mining, for Mr. COOPER suggests that it might be extensively and economically applied in large towns requiring mechanical power at many different places, if laid on in the streets the same as gas or water, and the pressure produced at some central station. A series of experiments are now being made at the Holmes Colliery, in order to ascertain the relative power required for compressing the air and that given out by the air engines, under different conditions of velocity and pressures of both steam and air. The introduction of this principle at the Holmes Colliery is exciting great interest in the South Yorkshire mining district; and on Thursday last, a large party of scientific and other gentlemen interested in coal-mining visited the colliery to inspect the new machinery now laid down. —*Colliery Guardian.*

A Year's Railway Slaughter.

IT appears from the returns, that the total number of persons killed on railways in the United Kingdom, last year, was 286, and the total number of injured 1,239. In 1869, the numbers were—killed, 321; injured, 1,232. Sixty-six passengers were killed, and 1,084 injured from causes beyond their control; and 24 were killed and 10 injured by their own misconduct or want of caution. The number of servants of railway companies or contractors killed and injured from causes beyond their own control was 25 and 118 respectively. Of the same class of persons, 90 were killed and 11 injured by their own misconduct or recklessness. Seventeen persons were killed and 3 injured at level crossings. The number of trespassers killed was 59, and injured 9. The total number of collisions and other accidents to passenger trains was 124, and by these 79 persons (65 of them passengers) were killed, and 1,194 (1,084 of whom were passengers) injured. The number of accidents to goods and mineral trains was eight, and by these 9 railway servants were killed and 6 injured, The total number of accidents to all trains were 132; the total number of persons killed by them 88; and the total number of injured, 1,200.—*Engineering.*

Complete Skeleton of an Ichthyosaurus.

A COMPLETE specimen of an Ichthyosaurus, the fish reptile, of the earlier Jurassic period, was exhibited last week at the College of the City of New York. This species, as the name indicates, was intermediate between fish and reptiles, having a head and body like a lizard, and the fins and tail of a shark. The bones and teeth of these remarkable animals have been found in great numbers in the bituminous marl-slate of that formation which, in England, is called Lias, and in Germany, Black Jura; but complete skeletons are extremely rare. The specimen exhibited measures twelve feet in length, and was excavated from a layer of shale in the vicinity of Boll, Wurtemburg. The head is twenty-two inches long, tapering off, as in the dolphin, into a mouth or snout, which is provided with over a hundred sharp conical teeth. The socket of the eye is a large circular cavity. Seventeen small bones enter into the composition of the eye, designed to diminish or dilate the pupil, and enable the animal to pursue its prey night and day. As in fishes, there is no neck, and immediately behind the head the body expands into the large belly, which becomes thin again toward the tail, terminating in a lash or whip. There are 153 vertebræ in the spinal column (of which 100 are in the tail). On each side are two fins directed downward. The abdominal fins have been displaced owing to the action of some disturbing cause, after the skeleton had become imbedded in the forming strata. In the abdominal cavity is the skeleton of a young animal about two feet five inches long, which is so placed that the end of its mouth reaches the pelvis of the old animal, while its tail is bent around toward its own jaws. From the position of the second skeleton above the ribs of the first, coiled up between the stomach and pelvis, Dr. Draper infers that the young animal was not swallowed, but was in the womb; and that, consequently, these reptiles bore living young.

This specimen was exhibited at Freiberg, Germany, for the benefit of wounded soldiers, and was purchased for $550 by General WEBB, President of the College of the City of New York.

Testing of Antimonial Preparations for Arsenic.

DR. VON ANKUM has instituted a comparative investigation of the various methods suggested for the detection of arsenic in antimonial preparations, especially tartar emetic. The author's method is to ignite the antimonial preparation to be tested with four times its weight of pure nitrate of soda, to exhaust the residue with water, to acidulate the solution slightly with nitric acid, to concentrate by means of evaporation, and to add first nitrate of silver, and next, very carefully, some ammonia; the result being the formation of a more or less deep brown-red colored precipitate, indicating the presence of arsenic, if present. The author states that, having taken only ten grains of tartar emetic, containing in that quantity less than half a milligramme of arsenic, he was enabled to detect the latter very readily by the method described.

The Cornish Miner.

The following stanzas are taken from "Rhymes from Cornwall," by the authror of "The Vale of Lanherne," recently published in London:

'Tis his to find the glittering ore,
For ages hid in death's dark womb;
To creep and climb, to dig and bore,
And build himself a living tomb,
Some six feet high, some four feet wide,
And reached o'er depths that few would stride.

If England's Church is for the poor,
The miner scarcely knows the way;
His chapel's seen on every moor
From Hingston Down to far Carn Brea;
Built by his own and comrades' hands,
The plain and lowly temple stands.

What's more, he both can pray and preach;
It was Saint Wesley taught him how;
His voice is strong, and plain his speech,
His style not graceful, I allow;
Much like the manner it may be
Of the poor folk at Galilee.

He takes his text from the same book
As the great lawn-sleeved doctors read:
A shepherd, but without the crook,
His sheep are sometimes wild indeed;
The outcasts often of the poor,
Too shabby for a Gothic door.

When his work's ended, and he dies
Much short of three score years and ten,
Hundreds with honest tears and sighs
Will gather—maidens, mothers, men;
And, as his toil-worn limbs they bring,
They sing the hymn he loved to sing.

But I've not done with him as yet;
He or his seed is in all lands;
His hand the Chilean ores must get;
On Chimborazo's range he stands;
Australian, Californian gold
Tells where a Cornishman takes hold.

His arm is strong, though spare his form;
His eye is clear, though pale his cheek;
If cold his hand, his heart is warm—
To find like his you far must seek;
Should he get rich in other zones,
To Cornwall he brings back his bones.

Exter Railway Brake.

WE find in a recent German journal an account of a new self-acting brake, invented by a German, named Exter, which has been put in very successful and satisfactory operation on the Bavarian railroads. For the purpose of experiment, it has been applied to cars of different sizes, large and small, and on road of a greater or less degree of inclination; and it has been found that whatever be the rate of speed, a train can be stopped by means of these brakes in a very short distance. The steam of the locomotive can be shut off and the brake of the tender applied, and this acts immediately upon all the other brakes of the train. In cases where the locomotive was detached from the train and moved off from it, the same result was accomplished.

Automatic Spectroscope.

DR. J. EMERSON REYNOLDS furnishes the following short communication to the *Chemical News:* My friend Dr. HUGGINS has recently described to the Royal Society the very valuable little registering spectroscope devised by Mr. HOWARD GRUBB, C.E., of this city, and lent by the latter gentleman to the Oran Eclipse Expedition. This instrument has been re-adjusted and supplied for use in my laboratory as an auxiliary to a very powerful spectroscope with an automatic adjustment of prisms lately constructed for the Royal Dublin Society by Mr. GRUBB. As some addition has been made to the registering spectroscope, which, in my opinion, renders it specially convenient for laboratory use, I will, with your permission, add a few words to the very interesting description of it given by the distinguished physicist who brought the apparatus under the notice of the Royal Society.

The slit, fitted to the spectroscope in the first instance, has been changed for one carrying a reflecting prism for the comparison of two spectra. A metallic cover encloses the whole of this part of the apparatus when not in use, so that the slit is completely protected from the acid fumes.

Instead of employing a card on which to make the pricks in registering the position of lines in a spectrum, I use a mica plate (of the size sold for covering *cartes de visite.*) The mica plate is held securely in its position on the movable table of the apparatus, and two standard points marked at the beginning and end of a set of registrations. The relative positions of the lines are then read off by placing the mica plate over a graduated arc, decimally divided, on a silver plate, taking care to make the standard points on the mica always coincide with particular divisions of the scale. The scale I use is an arc graduated into 250 parts, beginning at the violet end of the spectrum. The measures of standard spectra obtained by this arrangement are entered finally on maps by means of a 250 m.m. scale. I should add that each division of the graduated silver plate corresponds to ten minutes of arc, and, of course, each millimetre on the map has the same value in angular measurement. While I much prefer the mica plates for use in recording observations, card slips can likewise be used, the graduated arc being then laid over the card register and the positions of lines read off. The spectroscope is now placed upon a strong metallic stand, on which it can be moved in a horizontal direction by loosening a small clamping screw. The instrument is now one of the most convenient of its kind I am acquainted with for general laboratory use, as very accurate observations can be made and recorded with its aid in a surprisingly short time.

Method of Warming Railroad Cars.

FOR the purpose of warming and ventilating railway carriages, it is proposed by Mr. GRANDJEAU, of Paris, to use a reservoir of suitable capacity, divided into a number of compartments, in which are placed sponges saturated with the essence of petroleum, mineral essence, or any other carburet of hydrogen of a volatile nature. In the middle of these compartments spaces are left so as to introduce wicks, which should touch the bottom of the receptacle, the number of the same being as large or as limited as desired; the upper part of the wicks enter burners placed at the top of the reservoir. When these burners are lighted they constitute a regular stove, by means of which the warming of the carriage is effected.

Large Belts.

DURING the past weeks Messrs. J. and T. HEPBURN & SONS, of Long-lane, Southwark, have turned out some of the largest leather belts which have yet been made in this country. One of these belts is 120 feet long by 24 inches wide, and is made of a double thickness oi leather. It has been sent abroad to transmit the power from a forty horse engine.—*Engineering.*

MINING SUMMARY.

Nevada.

WHITE PINE REVIEWED.

The *News* of the 28th ult. has the following intelligence: "The severe storm, raging the whole week, has so far affected the working of our mines as to compel the suspending of work where there was insufficient shelter. In all the deep workings of the principal mines, however, work has gone on without cessation from that cause. The four mines connected with the new International mill have now but twelve men employed, for the reason that the mines are full of ore. The dumps are full, and there is no chance to work to advantage. There is ore enough mined to keep this mill running for six months. The tramway has been delayed by the rough weather. There are forty-seven stations in all for it, thirty-seven of which are finished. At station No. twenty a ledge was discovered this week while excavating for the supports. The croppings assay $700 to the ton, and show a ledge three feet in width. It is named the "Sharp." The ore is similar to the Ebenhardt. All mines on the hill that are working continue to improve in appearance. The few base metal mines working show promising prospects. The Bismuth has a large body of ore in sight, easily extracted. There has been but little work done on the West side of White Pine mountain this week. The snow on top is four feet deep, and work in open cuts is necessarily suspended. It is reported that a number of the most prominent mines on the west side are to change hands soon, and be owned and worked by one company. WELLS, FARGO & Co. shipped, during the last week, from this city, nineteen bars of bullion, valued at $23,640 48—produced by mills in this district. The ores from the Ward Beecher are worked at the Oasis mill, which turned out $38,000 worth of bullion last month. The pulp assays at the mill average $140 per ton. A chamber in the North Aurora, filled with waste rock, has been recently cleared out, and showed a large body of ore that assays $400 per ton. Eberhardt has out 200 tons very rich rock. Richer ore than ever has been struck in the General Lee."

ANNUAL REPORT OF THE HALE AND NORCROSS MINE.

From the tenth annual report of this Company, for the fiscal year ending March 2, 1871, we extract the following:

RECEIPTS.

Cash on hand	$ 30,303
Bullion	1,713,102
Premium on bullion	15,777
Returned freight for money advanced	11,326
Sundries	33,386
	$1,803,894

DISBURSEMENTS.

Dividends	$536,000
Reducing 64,974 ton of ore	725,487
Labor account	278,064
Wood and lumber	103,542
Supplies	45,076
Taxes	11,255
Superintendent, Clerk and Secretary	11,400
Sundries	36,416
Cash on hand, March 2, 1871	56,654
	$1,803,894

We take the following interesting statement from the report just published, embracing a period of five years:

	Ore Reduced, tons.	Av. Yield per ton.	Amount of Bullion.
1867	28,636	$47 32	$1,355,220
1868	55,333	34 14	864,998
1869	16,536	23 89	395,146
1870	45,441	27 13	1,232,929
1871	64,974	25 13	1.632,344
Five years	180,920	$30 29	$5,481,137

A NEW MILL FOR AUSTIN.

A movement is on foot to build a new mill at Austin. The *Reveille* of March 22, says, in relation to the enterprise: "At a meeting of citizens, which took place last evening for the purpose of perfecting an organization, R. L. Horton was elected President, and D. B. Starratt, Secretary. A motion was made, and carried, that the company be incorporated under the name of the 'Citizens' Mill Company.' The capital stock was fixed at $50,000, divided into shares of $25 each, which were made unassessable. The following gentlemen were elected trustees: Jas. E. Rooker, R. L. Horton, G. F. Dinsmore, D. B. Starratt, Hermann Sadler, M. M. Egan, and Jacob Dreyfuss. The necessary steps for incorporation are being taken to-day, so that 'The Citizens' Mill Company' may be considered an actual, living institution, bound to go on and, we hope and believe,

succeed. Mr. Jophn Howell was appointed Superintendent, and a force of men was dispatched to Ione this morning to begin the taking down of the Knickerbocker mill. The mechanical part of the work will be under the charge of Dan. Bell, the well-known millwright. In the course of a few days the work of grading on the site of the new Company will commence, and the mill will be put together as fast as it is possible to get the material here. We have not heard that any decision has been arrived at in regard to the style of furnace to be used. Very liberal offers are made by the owners of both the Akin furnace and the cylinder at the Big Smoky mill at White Pine, and it is quite certain that one of these roasting processes will be adopted."

RICH STRIKE AT BELMONT.

The *Reveille* has received a letter from Belmont which says "that a very rich strike has been made in the El Dorado South Mine of that place. At a depth of 100 feet below the water line, and 340 feet below the surface, the entire lode is found to be permeated with dark red chloride, and black sulphurets of silver of exceeding richness. Assays made yield as follows: chloride, $801 15; sulphurets, $2.175 64 per ton."

THE AUBURN MILLS.

The above works having been, according to the Reno *Journal*, thoroughly overhauled and put in working order, Mr. OSBISTON, the new Superintendent, has renewed operations. There is a large quantity of ore waiting at the mill to be reduced. It is claimed for this mill that it is the most perfect establishment of its kind on the Pacific coast, with facilities for giving quick returns with less loss than any other known process of reduction. Every resident of this State is interested in aiding every enterprise that tends to lessen the cost of working rebellious ores which abound in our mining districts, and the Stetefeldt furnace has thus far proved itself of more practical worth than any other which has been in general use in Nevada.

Iowa.

THE NEW CALIFORNIA LEAD DIGGINGS.

The Dubuque *Herald* has the following relative to the New California or Sand Prairie Diggings, situated in the town of Rice, Jo Daviess County: We copied from the Galena *Gazette*, a few days since, an article reporting the striking of mineral in large quantities at the New California or Sand Prairie Diggings, and now we come to make mention of this lead miners' Eldorado. A citizen of Dubuque, who once had an interest in those diggings made a trip there the other day, and from him we learn that the reports already given do not run before the facts, though exaggerations in reports of lodes struck up are so common. The Sand Prairie diggings are situated in the east bank of the Mississippi, about eighteen miles south of Dubuque. The most direct route to reach them from this point, and the cheapest, is to go to Bellevue and cross the river at that point. There are some half dozen or more companies owning diggings in the Sand Prairie range, most of them from Galena, but those owned by HARRIS & BURRICHTER, and those by WISE, SANDERS & Co. have yielded the largest returns thus far for the money expended. The first-mentioned company had their first hey-day here about two years ago; but WISE, SANDERS & Co: are the lucky ones just now, and it is the "big show" turned up by this company which has called attention and renewed interest to this section. But WISE, SANDERS & Co. now have a mine from which they raise 50,000 pounds daily, netting them $16,000. The mineral is in a huge cave, and is simply a wall of ore twelve feet high and forty-five feet wide. It is not imbedded in clay. He was the first one to discover ore in that section of the country, and this is the fourth lode he has struck.

HOW THEY WOKE THE DIGGINGS.

The New California diggings, as we before remarked, are situated on the Mississippi bank, or near the east bank, and the high water usually interferes with their working. The miners run a level or drift from the bank of the slough—a sluggish arm to the river channel—under a buff over 300 feet high. These drifts are all towards the east, and in some places are run over 2,000 feet. The mineral ranges can be traced as far east as Elizabeth, where are situated the famous Wishon diggings, the most prolific perhaps of any in the country. This last discovery at Sand Prairie was made higher up than any heretofore struck, being over the pipe-clay opening. All the other discoveries excepting those of HARRIS & BARRICHTER, have been made in the pipe-clay opening; bnt there is no doubt that large bodies lie over these openings, as the bluff is from 300 to 500 feet in height, and may have eight or ten openings above those worked. In regard to these diggings the fact seems very probable that they have hardly begun to work there yet, though such large quantities of ore have been raised. The mineral dips in the lower openings as deep as the bed of the river; but since the discovery, the cry is that they can work now when the water rises. This belief is founded on the fact that this last discovery is on a strata twenty-five feet above high-water mark. The depositions of our mineral-bearing rocks are ever a study to the philosophical miner, but in no section perhaps, have they puzzled the hard-fisted more than in this same Sand Prairie.

Colorado.

CONSOLIDATION THE GREAT NEED.

It is reported that measures are now in progress for the consolidation of at least three of the old companies, on the Gregory lode. That is to say, the same men will have control of the three companies and operate them in conjunction. This suggests, says the *Register*, how valuable this principle would be upon some immense veins in different parts of the county. "Nevada is called the great mining district of Gilpin county. All over the famous Quartz Hill are to be seen swarms of hardy miners, handling, assorting and carting the precious ores. In fact, four-fifths of the entire mineral product of our mines in this county come from that section, and all the result of individual working on single claims, or properties of 100 to 200 feet, and consequently worked to a very great disadvantage. In no other missing section in Colorado is a vein or lode traced and worked for so continuous a distance with such uniform results. Take the California, for instance; the great mother vein of this vicinity. You may trace it east from discovery 1,000 feet, where the same vein is known as the Gardner; and again you can trace the Gardner on east another 1,000 feet or more, and it becomes the Rhoderick Dhu. Then going back to the discovery again, we start west; running less than 500 feet we come to the Hidden Treasure, on the same vein. You continue on west, say 1,000 feet more or less, and you reach the Indiana, also on the same vein. It is true they are not connected by drifts as they might be, yet they are known from their course, the character of the vein, and its product. It is about the working of this vein or lode that we wish to say a few things, without reflecting on the management of any particular persons, and our remarks apply equally as well to the Burroughs, Kansas, Prize, and other fine veins. This California vein, as we said before, has been traced and is being worked for over half a mile in extent, and has produced under the different names of the California, Gardner, Rhoderick Dhu, Treasure, and Indiana, over two millions of gold and silver. And what amount of this handsome yield is profit? We venture to assert not over 15 per cent. on the sum total, when it should be 20 per cent. per annum. We know that 300 feet of the STALKER & STANDLEY claims alone gave a net profit above all expenses during the last two years of say $150,000. But our question is, why is not this entire vein made to pay a profit of 20 per cent. per annum of its product, and its yield increased 1,000 ounces per month, or say, $20,000 of our currency? Now, in brief, the answer is this. It is because Tom, Dick and Harry each own 100 feet, more or less, on the vein, and each must erect machinery, sink shafts, run levels, etc., in his own peculiar way and independent of the benefit his neighbor or either side could give him, or he is neighbor by consulting each other's interest and the interest and the advantage each could confer upon the other, and thus each man has the same expense to break and raise the ore from his individual property, as would one man in breaking and raising from the half dozen properties, and adding to what ought to be the actual cost three, four, or even six times. This is why one-fifth of the yield is not profit. But let Tom, Dick and Harry consolidate interests and properties, elect one of their number manager, the rest go to work under his direction, and instead of running three or four different engines on that number of claims, run one and work the three or four properties, then the result from the main shaft would be that we could count with some certainty upon one-fifth to one-fourth of the product being a net dividend to the owners. But until there is such a consolidation either by sale or otherwise, there can be little hope of realizing a larger net profit than now. With such consolidation, success would be certain."

Illinois.

NEW BESSEMER WORKS AT CHICAGO.

The Chicago (Illinois) *Railway Register* of a late date, says: By the efforts and energy of WILLIAM CHISHOLM, Esq., Manager of the Union Rolling Mill Company, a furnace is now in process of erection in Chicago for the manufacture of steel rails by the Bessemer process. Mr. CHISHOLM has been long engaged in the manufacture of railway iron, and is a prominent and leading ironmaster. The company are erecting a vast structure for the making of steel alone. Two immense "converters" are to be mounted, and several furnaces for the melting "pigs" etc. Besides these, there are to be two enormous ovens for drying the *ganster* in the tuyeres, and any number of cranes to raise the crude metal, coal, etc., into the cupolas. The machinery is to be propelled by an engine with a cylinder forty-five inches in diameter and a four-foot stroke. In the rolling mills of the company, as they are working at present, a mile per day of iron rails are made, of the best quality. Ten car loads—about 100 tons of coal—are consumed per day, and 350 workmen employed. When we remember that this branch of manufactures is still in its infancy here, we may congratulate the company and our city upon the enterprise and forecast which Mr. CHISHOLM has evinced in his skillful management, keeping pace with our older Eastern neighbors in a way that bids fair to outstrip them in the race, and render the West no longer dependent upon them for railway iron. Pretty good evidence of this is, that the company already have an order for 200,000 tons of steel rails at $107 50 per ton.

Utah.

THE EMMA MINE.

This most celebrated of all the mines of Utah furnishes an example to faint-hearted prospectors of the folly of jumping at the conclusion that because a body of ore, rich at its outcrop, has entirely disappeared as work has progressed downward, the mine has no permanency, and is not worth prospecting any further. The surface of the Emma mine was quite rich, but all signs of ore disappeared after penetrating some distance into the ground. The owners, however, continued to sink, and passed through eighty feet of barren ground before striking the present body of ore. Had they been as weak-hearted as many miners we have known, they would have thrown up the sponge after going through half that depth. As nature repeats itself, it is safe to say that, where rich ore is found at any particular point, more exists in that neighborhood, though it may not be of easy access.—*Nevada Revielle.*

THE NEVADA COUNTY MINES.

The Nevada *Gazette*, March 9, announces the completion of the tunnel of GENTRY & Co., at Wet Hill, 1100 feet in length. The company has commenced sluicing gravel through it, using 300 inches of water. The North Bloomfield Company are running drifts in their claims, to ascertain the course of the bed-rock. They are working eighty men, and are taking out $1000 per day. This is only prospecting work. On Relief Hill there are four mines at work. The Wolkenshau Company, in consequence of a scarcity of water, have begun drifting, with the best of results. They have been at work two months, and are taking out $30 dollars per dry to the man. The Eagle is at work with similar results. There are at least fifty men at work on the hill. The product of the Eureka mill for twelve days was $72,000.

Oregon.

COOS BAY COAL MINES.

There are only two coal mines at Coos Bay, Oregon—one is the Newport, owned by FLANAGAN & MANN, and the other the Eastport, owned by a San Francisco corporation. The San Francisco *Commercial Herald* has the following account of their development: The Newport Mine was opened in 1856, by its present owners, and has been continually worked from that date. It is now capable of yielding five hundred tons of coal per day, but only fifty tons on an average has been taken out for the past few years. Within the past month a railroad from the mine to a shipping point has been completed, which greatly reduces the cost of shipment, and for the future the mine will be worked to its full capacity, provided that a sufficient number of vessels can be had to carry the coal to market. From the reports of civil engineers who have examined the mine, it is estimated that there are over seven million tons of coal within the property of these owners, besides an incalculable quantity of coal which is controlled by their locations, that cannot be approached except through their property. The mine is not, nor has ever been, in any way connected with or controlled by any monopoly. The Eastport Mine was opened in the same year; but, owing to frequent "breaks" in the coal deposit, it was not worked for several years. In 1868, JOHN PERSCHBACKER, the then owner of this property, reopened this mine, and made regular shipments of coal to San Francisco. In the fall of 1869 he sold the mine to its present owners. The quantity of coal shipped from these two mines, for the year 1870, was 21,717 tons. The increased demand for this superior quality of domestic coal, and the recent improvements on the Newport Mines, give every assurance that fully 50,000 tons will be receivable at this port for the year 1871.

Product of the Lake Superior Iron Mines in 1870.

GROSS TONS OF ORE. NAME OF MINING COMPANIES, & MINES WORKED ON LEASE.	Shipped by—Marq. and Ont. R. R.	Peninsula Division Chi. & N. W. R. R.	Other Shipments.	Totals.
Jackson Mine	5,086	113,104	4,520	122,710
Cleveland Iron Mining Co.	50,129	82,755	.....	132,884
Lake Superior Iron Co.	166,582	.....	.....	166,582
Barnum mine, Foster mine, Iron Cliffs Co.	.....	44,793	.....	44,793
	.....	23,458	.....	23,458
Washington Iron Co.	79,762	.....	.....	79,762
Pittsburgh and Lake Angeline Iron Co.	24,232	53,467	.....	77,799
Champion Iron Co.	72,518	.....	643	73,161
New York Iron Co.	.....	90,702	4,107	94,809
New England Iron Co.	24,871	.....	.....	24,871
Marquette Iron Co.	3,702	.....	.....	3,702
Grand Central Iron Co.	.....	1,809	.....	1,809
McCumber mine	3,002	1,864	.....	4,866
Parsons' mine	1,896	.....	.....	1,896
Winthrop Iron Co.	3,469	.....	.....	3,469
Grand Total	435,249	411,952	9,270	856,471
Product of 1869				643,238
Increase				213,233

PIG IRON PRODUCED FOR THE YEAR 1870.

	Gross tons.
Moran Furnace	5,952
Champion Furnace	5,576
Michigan Furnace	4,858
Greenwood Furnace	3,992
Brancroft Iron Co.	3,710
Collins Iron Co.	4,100
Pioneer Furnaces	5,853
Deer Lake Iron Co.	2,500
SCHOOLCRAFT COUNTY.	
Schoolcraft Iron County	2,869
Bay Furnace	3,498
DELTA COUNTY.	
Fayette Furnace (estimated)	5,000
Total pig iron product	47,848
Product of 1869	38,504
Increase	9,344
Shipped as follows:	
By Marquette and Ontonagon R. R.	27,399
By Peninsula Division C. & N. W. R. R.	8,515
Other shipments	10,250
On hand at the furnaces	1,684—47,848
Total shipments over the M. & O. R. R.:	Gross tons.
Iron ores	435,249
Pig iron	27,399—462,648
Total shipments over the Peninsula Division C. & N. W. R. R.:	
Iron ore	411,952
Pig iron	8,515—420,467

TOTAL AMOUNT OF ORE AND PIG IRON PRODUCED.

	Iron Ore, tons.		Iron Ore, tons.
1856	7,003	1864	235,123
1857	21,000	1865	195,256
1858	31,035	1866	296,872
1859	65,679	1867	460 320
1860	116,998	1868	493,290
1861	45,430	1869	643,238
1862	115,721	1870	856,471
1863	185,259		
Total			3,768,695
	Pig Iron, tons.		Pig Iron, tons.
1858	1,629	1865	12,283
1859	7,258	1866	18,437
1860	5,660	1867	30,911
1861	7,970	1868	36,425
1862	8,590	1869	38,504
1863	9,813	1870	47,848
1864	13,832		
Total			239,160

TOTAL AMOUNT AND VALUE OF IRON PRODUCED.

	Tons, Iron Ore.	Tons, Pig Iron.	Value.
1856	7,003	.....	$28,000
1857	21.000	.....	60,000
1858	31,035	1,629	249,202
1859	65,679	7,258	575,529
1860	116,998	5,660	736,496
1861	45,430	7,970	419,401
1862	115,721	8,590	984,977
1863	185,259	9,813	1,416,935
1864	235,123	13,832	1,867,215
1865	195,256	12,283	1,590,430
1866	296,872	18,437	2,405,960
1867	460,320	30,911	3,475,720
1868	493,290	36,425	3,676 700
1869	643,238	38.504	4,973,435
1870	856,471	47,848	5,339,804
Total	3,768,695	239,160	$27,799,804

British Coumbia.

ANTHRACITE COAL MINES.

The arrival at San Francisco of a cargo of anthracite coal from our island of Queen Charlotte would appear to have excited a good deal of interest. The *Bulletin* notices the coal both in its money and commercial article. "A noteworthy feature of the week," says our cotemporary, "has been the arrival from Queen Charlotte Island of a cargo of anthracite, said to be the first hard coal discovered on the Pacific Coast. The samples exhibited have elicited favorable comment. The discovery will be of great benefit to California on account of the accessibility of the mines." And again in its money article it says: "A sample of it was on exhibition at the Merchants' Exchange yesterday afternoon. It is said to resemble the Lackawanna description. The discovery is an important one to the manufacturing interests of California. Hitherto all our hard or anthracite coal has been imported from domestic Atlantic ports, the freight formerly costing from fifteen to eighteen dollars per ton, though within a year or two it has been brought for much less. The deposit at Queen Charlotte Island is said to be extensive, and the cost of bringing the coal to this port is light. PICKETT & HARRISON have been appointed agents for San Francisco."

California.

MARIPOSA COUNTY—SALE OF MINES.

According to the *Gazette*, February 24, the old Whitlock and Sherlock property, which has lain idle for six years, has been transferred to STEPHENS & LAMBER. They will repair the mill at WHITLOCK'S, puttting in new batteries, and will put a sufficient portion of the mine in working order. We understand that the sale is not absolute, but that STEPHENS & LAMBER contract to-day $20,000 fo the property, if after working it eight months they shall be satisfied with it.

MARKET REVIEW.

The Coal Trade.

NEW YORK, March 31, 1871.

The feeling in the anthracite market this week is very good. Dealers on all hands seem to have settled themselves down to the new state of affairs, and are taking things quietly. The small amount of coal reaching tide-water satisfies the more pressing demands of the consumers. In the meantime, the approach of warm weather is gradually reducing the demand for coal for heating. The substitutes for anthracite which we suggested in a former article are extensively adopted by those whose circumstances enable them to do so. The position of affairs in the regions remains unchanged. Rumors of resumptions to take place at dates more or less remote are continually heard in going through the market. There is, so far as we can learn, no particle of truth in them.

In publishing the following letter we depart from our order, to pay no attention to communications unaccompanied by the real names of the writers. We do this, because the tone of the letter is candid and dignified. If we have committed any unintentional injustice, perhaps this presentation of one side of the case may correct it. We must say, however, that the whole series, not of one or two, but of a great many articles of this JOURNAL on the coal trade, has in our opinion represented all parties fairly. We wish it understood that we are heartily in favor of a *bona fide* settlement by arbitration, and opposed to whatever hinders it:

ST. NICHOLAS, Pa., March 29, 1871.

TO THE EDITOR—Sir: I am surprised at the tone of your comments on the state of affairs in this region, and were I not acquainted with the facts as they are, your comments would lead me to think them quite the contrary.

The operators have offered to arbitrate the matter of wages, and the miners, or their representatives, have rejected it. You surely must be aware of this fact, so for as the Schuylkill region is concerned, and yet for the last two weeks your articles would lead those ignorant of it to think that the miners were anxious to have the question arbitrated.

One thing that the operators are not willing to arbitrate, is the right to manage their own business. I am now doing some work that is absolutely required, and to do it I am compelled to employ men who are totally unfit for it. Have you any idea how these things are managed? When I asked miners who I knew were capable of doing the work to do it, and what they would do it for, they said they must have a meeting first. So a meeting was called by their Branch President, and the next day I was informed that the work could only proceed if I employed A B & C to do it. Personally I do not object to A B & C, for they are orderly and peaceable men, but they are not miners, hence wholly unfitted to do the work I had to have done; yet I could do nothing but submit, or not have the work done, in which case I would incur great pecuniary loss. Instances of this kind occur daily when the mines are in operation, and I believe that you, who are so satisfied that the miners "are a reasonable, sensible set of men, and demand simply justice," would, were you an operator, feel that such acts outraged justice. If any accident occurs whereby A B or C are injured, the operator is blamed and held responsible, yet he would have prevented the accident by employing men competent to do the work, if he could have done so. It is this constant interference in even the most trivial details of the business that has brought about, to a great extent, the bitterness of feeling that exists; and I hope that however strongly you may advocate the miners' claim for "basis," you will admit that this interference with the management of the business is neither reasonable, sensible nor just.

OPERATOR.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending March 25, 1871, compared with week ending March 26, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	69,356	652,367	10,995	609,197
†Schuylkill Canal	1,124	38,392	707	37,060
Lehigh Valley R. R.	....	....	....	....
Lehigh & Sus. R. R.	29,680	179,388	1,791	66,819
†Lehigh Canal	....	....	....	.....
Scranton North	13,125	141,311	....	.....
" South	37,174	370,069	....	....
Penn. Coal Co., rail	19,544	203,566	208	3,445
" " canal	....	....	....	....
Del. & Hud. Canal Co.	....	....	....	....
" " East	10,733	111,782	1,069	42,402
" " West	1,380	21,564	....	12,720
South	10,617	48,380	....	....
Shamokin	6,106	61,618	11,423	99,945
Trevorton	2,567	6,309	....	....
Lykens Valley Coal Co.	....	....	891	10,937
Wyoming South	....	....	....	....
Wyoming North	....	....	....	....
P. N. Y. C. & R. R. Co.	6,736	70,860	462	34,786
Williamstown Co'y	6,122	50,645	....	....
Big Lick Col	....	....	....	15,342
Total	205,165	1,953 938	27,541	941,760
1870	27,541	941,760		
Decrease week and year	177,624	1,012,178		

* Less coal transported for Company's use and Bituminous coal.
†Closed for the season.

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, March 25, 1870.

	Tons. Cwt.
From Port Carbon	— —
" Pottsville	— —
" Schuylkill Haven	707 00
" Port Clinton	— —
Total for week	707 00
Previously this year	36,353 17
Total	37,060 17
To same time last year	36,362 02

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending March. 25, 1871, compared with week ending March 26, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
R. & O. R. R.	6,119	59,604	34,136	236,194
C. & O. Canal	....	....	19,835	44,686
H. & B. T. R. R.	6,028	52,029	8,074	65,279
Harrisburg & D.	10,117	113,145	18,116	125,014
L. V. R. R.	982	4,292		12,734
P. & N.Y.C. & R. Co.	4,271	48,880	6,512	67,053
Total				

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, March 25, 1871.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB VAL. BRANCH.

	Tons.	Cwt.
From St. Clair	438	08
" Port Carbon	214	05
" Pottsville	1,092	16
" Pine Grove	287	00
" Tamaqua	6,734	15
" Harrisburg	66	14
" Dauphin	4,936	11
Total	14,489	09

FOR SHIPMENT BY CANAL.

Passing Frackville Scales		
" Mill Creek "	125	04
" Schuylkill Valley Scales		
" Mt. Carbon "	604	05
" Cressona "	206	05
" Pine Grove "		
" Tamaqua "	935	14
Total		

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	2,798	18
" Shamokin	5,598	07
" Herndon		
Total	8,397	05

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	982	12
" Lebanon & Pine Grove Branch	350	15
Total	1,333	07

CONSUMED ON LATERALS.

From Frackville Scales		
" Mill Creek "	176	14
" Schuylkill Valley Scales	774	01
" Mt. Carbon "	223	10
" Cressona "	66	13
" Pine Grove "	185	06
" Tamaqua "	91	16
" Shamokin "		
" Trevorton "		
Total	1,519	02

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn's Br.		
" " Alburtis, " "		
" " Plymouth R. R., G. & N. Br.		
" " Connecting R. R. "		
" " Willow Street R. R.		
Total		

BITUMINOUS.

From Harrisburg	13,094	08
" Connecting R. R., G. & N. Br.		
" Junction R. R.	69	09
Total	13,163	17

COAL FOR COMPANY'S USE.

Anthracite	4,491	08
Bituminous	99	15
Total	4,592	04

RECAPITULATION.

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leb. Val. Branch	14,489 09	88,772 16	d72,283 07
For Shipment by Canal	935 14	2,456 00	d1,520 03
Shipped Westward via Northern Central R. R.	8,397 05	2,209 10	i 6,187 15
Shipped West or South from Pine Grove	1,333 07	968 14	i 364 13
Consumed on Laterals	1,519 02	2,028 10	d 509 08
Lehigh and Wyoming Coal		319 15	d 319 15
Total Anthracite paying fr'gt	26,674 17	94,755 05	d68,080 08
Bituminous	13,163 17	8,209 16	i4,954 01
Total of all kinds paying fr'gt	39,838 14	102,965 01	d63,126 07
Coal for Company's use	4,529 04	4,175 11	i 416 13
Total Tonnage for Week	44,430 18	107,140 12	d62,709 14
Since Dec. 1, 1870	799,634 14	860,551 17	d60,917 03
Total to date	844,065 12	967,692 09	d123,62617

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	707 00	2,206 06	i 1,498 06
" Port Clinton	— —	— —	— —
Total Tonnage per Week	707 00	2,206 06	i 1,498 06
Since Dec. 1, 1870	36,353 17	34,373 16	i 1,980 01
Total to date	36,060 17	36,579 02	i 481 15

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, March 25, 1871:

From St. Clair		
" Port Carbon	438	08
" Pottsville	214	05
" Schuylkill Haven	1,092	16
" Auburn	2,515	10
" Port Clinton	6,734	15
" Allentown and Alburtis		
" Harrisburgh and Dauphin	18,116	13
Total paying freight	29,112	07
Coal for Company's use	4,592	04
Total for week	33,704	11
Previously this year	646,554	15
Total	780,259	06
To same time last year	819,878	08

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending March 25, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal		
By Railroad East	1,069 00	42,402 00
" West		12,720 00
" South		
TOTAL TONS,	1,069 00	62,122 00
For the same period last year.		
By Del. and Hud. Canal		
By Railroad East	10,733 00	111,782 00
" West	1,380 00	21,564 00
" South	10,617 00	48,380 00
TOTAL TONS,	22,730 00	181,726 00

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending March 25, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	203 19	3,445 10	19,544 17	203,566 14
" Canal	— —	— —	— —	— —
Total	203 19	3,445 15	19,544 17	203,566 14
Decrease 180,780 08 tons.				

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending March 25, 1871-Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871. tons ct	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	1919 04	23752 10	5642 13	167481 02
Upper Lehigh Region		2577 17	4614 06	10930 13
Mahanoy Region				
Hazleton Region	73 00	300 05	916 04	2043 11
Beaver Meadow Region				
Trescow Region			1043 08	
Mauch Chunk Region	86 15		17704 13	30089 18
Totals	2078 19	26636 12	80730 19	210545 04
Increase				
Decrease	24557 13		129814 05	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	1791 13	20980 03	68919 15	172368 19
Forwarded East of Mch Chunk by Canal				
Delivered at and above Mauch Chunk	241 19	63 10	9672 11	7327 12
Delivered to L. & B. R. R. at Plymouth Bridge		5298 18		19944 19
L. V. R. R. at Sugar N.	45 07	694 01	2138 13	3903 14
Totals	2078 19	26636 12	80730 19	210545 04
Of the above there was transported on acc'nt of L. C. & N. Co.	86 15	1184 11	18941 00	40164 06
W.-B. C. & I. Co.	1677 05	10718 00	40560 12	63219 17
Totals.	1764 00	11902 11		103444 03
Increase				
Decrease	10138 11		43992 11	

Report of Coal forwarded by Pa. & N. Y. R. R. Co., for week ending March 18, 1871.

	BITUMINOUS. Tons.	Cwt.	ANTHRACITE. Tons.	Cwt.
By Rail	6,512	—	462	—
Previously this year	60,641	07	34,331	04
Total by Rail	....	..	....	..
By Canal	....	..	....	..
Previously this year	....	..	....	..
Total by Canal	....	..	....	..
Total for the year	67,053	07	34,793	04
To the same time last year	48,830	—	70,590	12
Increase	18,223	07	35,797	08

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending March 25, 1871, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt
Total Wyoming	783 12	71,663 08
" Hazleton	1,829 06	209,097 08
" Upper Lehigh		442 06
" Beaver Meadow	292 02	75,112 18
" Mahanoy	8,676 18	90,214 17
" Mauch Chunk	16 12	1,756 02
Total Anthracite	11,598 10	448,327 17
Bituminous Coal from all sources		12,734 00
Total by rail and canal	11,598 10	461,061 17
Same time last year	76,357 02	822,761 03
Increase		
Decrease	64,758 12	368,699 06
Forwarded East from M'h Chunk by rail	10,301 12	384,018 01
Same time last year	66,124 18	729,026 00
Increase		
Decrease	55,823 06	345,007 19

RECAPITULATION.

Forwarded East from M'h Chunk by rail	10,301 12	384,018 01
To N. C. R. R., at Mount Carmel		18 00
Forwarded North from L. & B. Junction	462 00	34,683 08
To L. & S. R. R. at Packerton for rail	129 19	2,151 09
Delivered at M'h Chunk		
Delivered on line of road above Mauch Chunk	10 08	366 09
Delivered above M. Chunk for use of L. V. R. R.	151 00	3,514 11
To L. & S. R. R., at P'n Har., for railroad	543 11	13,989 08
Do. for canal		94 10
At M. Chunk for canal		7,060 19
		2,431 02
Total Anthracite	11,598 10	448,327 17
Bituminous Coal		12,734 00
Total all kinds	11,598 10	461,061 17

Shipments of Cumberland Coal

or the week ending Saturday, March 25, and for the year 1871:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M	.....	.....	.....
Borden	2,646 11	1,823 18	4,470 09
Consolidation	6,207 14	6,166 08	12,374 02
Spruce Hill	1,073 16	.....	1,073 16
Midlothian	2,172 16	1,041 00	3,213 16
H. and Baltimore	660 17	1,469 15	2,070 12
do Va M	1,782 19	.....	1,782 19
V C & I Co	.....	.....	.....
G. C. C. and I	2,573 02	1,154 17	3,727 19
Big Vein	2,595 04	.....	2,593 04
Maryland	2,829 05	4,426 19	7,256 04
American	,124 19	3,813 01	5,938 00
Atlantic	1,564 16	.....	1,564 16
Piedmont	2,132 00	.....	2,132 00
Swanton	1,232 00	.....	1,232 00
Barton	890 00	.....	890 00
Potomac	1,584 15	.....	1,584 15
George's Creek M. C.	.....	.....	.....
Franklin	2,065 19	.....	2,065 19
Total week	34,136 13	19,835 18	53,972 11
Previous	202,057 09	24,832 03	226,889 12
Total year	236,194 02	44,668 01	280,862 03

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, April 1. SCHUYLKILL.	R. A.	W. A.	AT PHILADELPHIA, March 31. R. A.	W. A.
Lump	$—	$—	— —	— —	
Steamer	— —	— —	— —	— —	
Broken	— —	— —	— —	— —	
Egg	— to —	— to —	— —	— — to —	
Stove	— to —	— —	— —	— — to —	
Chestnut	— to —	— —	— —	— — to —	
Pea	— —	— —	— —	— —	
LEHIGH.					
Lump, (along side)	— —	— —	— —	— —	
Broken	— —	— —	— —	— —	
Egg	— —	— —	— —	— —	
Stove	— —	— —	— —	— —	
Chestnut	— —	— —	— —	— —	
Pea	— —	— —	— —	— —	
SPECIAL COALS.*					
Diamond Vein	R. A.	8 00	— —	— —	
New England	" "	— —	— —	— —	
Locust Dale	W. A.	7 50	— —	— —	
Honey Brook, Le'h	W. A.	10 00 to 12 00	— —	— —	
Spring Mountain	" "	10 00 to 12 00	— —	— —	
Sugar Creek	" "	10 00 to 12 00	— —	— —	
Sugar Loaf	" "	10 00 to 12 00	— —	— —	
Old Comp'y's	" "	10 00 to 12 00	— —	— —	
Cross Creek	" "	10 00 to 12 00	— —	— —	
Room Run	" "		— —	— —	
Girardville	" "		— —	— —	4 75
McMichael	" "		— —	— —	4 75
Shamokin	" "		7 50	5 25	— —
Lykens Valley	" "		— —	5 75	— —
Broad Top	" "		7 50	— —	— —
Hill & Harris	" "		— —	4 75	— —
Henry Clay	" "		— —	5 00	— —
Powelton	" "		7 50	— —	4 75

*Dealers in these coals may be found in our advertising columns.

Company Coals.

April, 1871.

No quotations during strike.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port	—	—	—	—	—	—
Pittston at Weehawken	—	—	—	—	—	—
Lackawana at do	—	—	—	—	—	—
Wilk'b're at Hoboken	—	—	—	—	—	—
Old Co. Lehigh at Pt. Johnston	—	—	—	—	—	—
Lehigh at E. Port	—	—	—	—	—	—

For freights to different points, see "Freights."

Prices for Coal at Mauch Chunk.

April 1871.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein f.o.b. at Phila.	$	—
Lemon " " "		—
Cumberland Vein Coal		—
Consolidation Coal Co.'s on board	N. Y.	—
Maryland Coal Co. "	"	—

Prices at Baltimore—March, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$—	@—
Pittston and Plymouth, do	—	@—
Shamokin Red or White Ash, do	—	@—
Lykens Valley Red Ash, do	—	@—
Zerba Valley	—	@—
Treverton	—	@—
By retail, all kinds per ton of 2240 lbs	—	@—
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 60	@4 75
Fairmont and Clarksburg gas, f. c. b. at L. Point	6 00	@6 50

Prices at George't'n, D.C., & Alexandria, Va.

April, 1871.

George's Creek and Cumberland f. o. b. for shipping..$4 75

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$—	@—
Lykens Valley	—	@—
Shamokin Red or White Ash	—	@—
Treverton and Zerba Valley	—	@—

Prices of Gas Coals.

April, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Beloni, Jr., 41-43 Pine st., N.Y.

	Duty, $1 25, gold Coarse	Slack.
Block House	$1 75	@—
Gowrie	1 75	@—

Corrected by Bird, Perkins & Job, 36 South street.

	Coarse.	Culm of Coal.
Picton	$2 25	@1 25
Sydney	2 25	@— 80
Lingan	1 60	@— 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@— 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.	
Westmoreland	7 10	@7 25
Fairmount Gas Coal Co. of N. Y.	7 50	@— —
Despard Coal Co	$7 50	@— —
Penn	7 75	@8 00
Newburg Orrel Gas	— —	@— —
West Fairmount Gs Coal	8 00	@— —

AT PHILADELPHIA.

Powelton	$7

Prices of Foreign Coals.

April, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00	@— —
" " Cannel	11 50	@12 50
" " House	— —	@15 00
" " Orrel	12 00	@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel	18 00@20 00

Per ton 2,000 lbs. delivered.

Freights.—April, 1871.

TO EASTERN PORTS.	From Philada.	From E. Port and Port Johnston.	From Newbury	From Rondout
Amesbury	$2 50	$2 00		
Bangor	2 30	1 60		
Bath	2 30	1 75		
Boston	2 10	1 85		
Bridgeport	1 75	1 00		
Bristol	2 00	1 40		
Cambridgeport	2 75	2 00		
Derby	2 00	1 20		
Dighton	2 30	— —		
East Cambridge	2 35	2 00		
Fall River	2 00	1 40		
Hackensack	1 75	1 00		
Hartford	2 50	1 50		
Jersey City	1 40	60		
Middletown	2 25	1 25		
Mystic	— —	1 25		
New Bedford	2 00	1 40		
Newburyport	2 65	1 85		
New Haven	1 90	1 00		
New London	1 76	1 25		
Newport	2 00	1 40		
New York	1 35	60		
Norwalk	1 80	1 00		
Norwich	2 30	1 30		
Pawtucket	2 30	1 50		
Portland	2 30	1 50		
Portsmouth, N. H.	1 45	1 85		
Providence	2 00	1 25		
Rockport	2 10	1 65		
Saco	2 25	1 75		
Sag Harbor	1 70	1 20		
Salem	2 35	1 65		
Stamford	2 00	1 00		
Stonington	2 00	1 30		
Taunton	2 30	1 75		
Warren	— —	1 40		
Washington	1 25			
TO RIVER PORTS.				
Albany				
Catskill				
Cockaackie				
Coeyman's				
Cold Spring				
Fishkill				
Haverstraw				
Hudson				
New York				
Nyack				
Poughkeepsie				
Rhinebeck				
Rondout				
Saugerties				
Sing Sing				
Stuyvesant				
Tarrytown				
Troy				
West Point				
Yonkers				

Foreign and Provincial Freights.

April, 1871.

Closed for the winter.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons..£14 00@£16 00

Liverpool, 5 per cent primage..13s @14 ton.

TO NEW YORK.

Provincial.

Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Rates of Transportation to Tide Water.

Closed for the Season.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon..$4 00

Less drawback of 50 cents on all Coal shipped east of New Brunswick and south of Cape Henry.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$1 84
C. R. R., N. J., Easton to Elizabethport	2 62
Shipping expenses at Elizabethport	25
Warfage	10
Total	$4 83

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton	$1 84
C. R. R., of N. J., Easton to Pt. Johnson	2 72
Shipping expenses	25
Warfage	10
Total	$4 91

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ —
Morris & Essex R. R. Easton to Hoboken	—
Shipping expenses	—
Warfage	—
Total	$ —

TO SOUTH AMBOY.

L. V. R. R., R. & D. R. R., Cam. & Am. R. R.)	—
Shipping Expenses,	—
Total	$ —

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	—
C. RR. of N. J. Easton to Elizabethport	—
Shipping expenses	—
Wharfage	—
Total	$ —

METALS.

NEW YORK, March 31, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ₩ lb; Railroad, 70 cents ₩ 100 lbs.; Boiler and Plate, 1¼ cents ₩ lb; Sheet, Band, Hoop, and Scroll, 1¾ to 1¾ cents ₩ lb; Pig, 7 ₩ ton; Polished Sheet, 3cents ₩ lb; Galvanized 2¾; Scrap Cast, $6; Wrought, 8 per ton.

	Store Prices.
Pig, Scotch No. 1, ₩ ton	32 00@34 00
Pig, American, No. 1	34 00@36 00
Pig, American, No. 2	32 00@34 00
Pig, American, Forge	31 00@32 00
Bar Refined, Englishand American	— —@75 00
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes, less 5 ₩ ct.	110 00@115 00
Bar, Refined " "	77 50@ — —
Bar, Common " "	85 00@ — —
Scroll " "	— —@ — —
Ovals and half-round " "	100 00@120 —
Band " "	95 00@105 00
Horse Shoe " "	92 50@ 95 —
Rods, ¾ to 3-16 inch " "	82 50@120 —
Hoop " "	100 00@140 00
Nail rod	— —@6¾ —
Sheet, Russia, as to Nos. (gold)	10½@—11
Sheet, Single, D. and T Common	—4½@— 6
Sheet, Galv'd, Nos. 14 to 16 10 and 12c. Nos. 27, 28, and 29, 13@14	
Rails, English (gold), ₩ ton	54 50 @59 00
Rails, American, at Works in Pa.	70 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₩ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ₩ lb; over 11 cents, 3½ cents ₩ lb, and 10 ₩ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₩ lb	— 15	@— 18
English Spring (2d and 1st quality)	— 7	@— 10
English Blister (2d and 1st quality)	— 10	@— 17
English Machinery	— 11½	@— 14
English German (2d and 1st quality)	— 13	@— 15
American Blister "Black Diamond"	— —	@—12
American, Cast, Tool do.	— 16	@— 17
American, Spring, do.	— 9	@— 11
American Machinery, do.	— —	@— 12
American German, do.	— 9	@— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 2¾ cents ₩ lb; Manufactured, 45 per cent. ad val.

	All Cash.	
Copper, New Sheathing, ₩ lb	—	@— 30
Copper Bolts	—	@— 32
Copper Braziers, 16oz. and over	—	@— 32
Copper Nails	—	@— 37
Copper, Old Sheathing, &c. clean	19	@— 20
Copper, Chili Pig	—	@—
Copper, American Ingot	21½	@— 21¾
Yellow Metal, New Sheating	—	@— 22
Yellow Metal Bolts	24	@— —
Yellow Metal Nails	—	@— 22

LEAD.—Duty: Pig, $2 ₩ 100 lbs.; old Lead, 1½ cents ₩ lb; Pipe and Sheet, 2½ cents ₩ lb.

Galena, ₩ 100 lbs.	$— —	@— —
Spanish (gold)	6 15	@6 20
German, do.	6 15	@6 20
English, do.	6 20	@6 50
Bar (net)	— —	@6 75
Pipe (net)	— —	@10 25
Sheet	— —	@10 25

Colwell, Shaw & Willard Tin-Lined Pipe 15 cts. ₩ lb.

TIN.—Duty: Pig, Bars, and Blocks, 15 ₩ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₩ cent.; Roofing 25. ad val.

	Gold ₩ lb.
Banca	@38¼
Straits	34 @33¾
English	— @33

PLATES. Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ₩ box	$8 @2¼@9 00	$10 00 @10 50
I. C. Coke	7 25@7 75	8 37½@ 8 75
Coke Terne	6 23 @7 25	7 25 @ 8 25
Charcoal Terne	7 75 @8 25	9 00 @ 9 50

REMARKS.

IRON.—There has been considerable inquiry for parcels of Scotch Pig to arrive, but lots on the spot are slow of sale, as prices generally are above the view of buyers. The sales are 175 tons Eglinton at $32 @ $33; 200 do. Glengarnock, to arrive, at $32 50; 150 do. and 500 do. Eglinton, on private terms. American remains quiet but steady at $34 @ $36 for No. 1, and $32 @ $34 for No. 2. New Rails continue in fair request, and sales have been made of 500 tons, 50 lb., English, at $55 50, gold, and 340 do. Old Double-Headed, on private terms we quote English new $55 @ $57, gold, and American $70 @ $72, currency, at the works in Pennsylvania. Refined Bar continues dull, though holders are very firm in consequence of the protracted coal difficulties, and the high prices demanded by the Philadelphia makers. Fifty tons Swedes Bar sold at $78, gold. Burdens extra Refined Iron, Round and Square, is quoted for two inches to ¼ inch, $115 to $145—do. 2½ to 4 inch 120 to 135—Flats 1¼ to 4½ by ¼ to 1 inch, to 8 by 1¼ to ½ inch $115 to $140—do. ½ by ¼ to 1¼ by ¼ to 1 inch $155 to $120—and Horse Shoe $115, less 5 per cent, cash.

LEAD.—There has been more business in Pig, but at prices rather in buyers' favor; the transactions embrace 300 tons Spanish at $6.15 @ $6.18; and 25 do., $6.20 gold; the market closing weak at $6.18 @ $6.20 for ordinary Foreign. Bar 8¼ cents, and Sheet and Pipe 10¼ cash, less 10 per cent. to the Trade. Tin-lined Pipe 15, less 2 cents to the Trade.

TIN.—Telegraph accounts from London note an advance there in Pig, Straits being quoted £129, and, with prices said to be ruling here now below those current abroad, the market is firm and higher, with a large business: the sales are 10,000 slabs Straits here and in Boston, mostly on the spot, at 32 @ 32¼ cents, and resales of 500 slabs at 33 cents, now held firmly at 33 @ 33½ on the spot and 33¼ to arrive; 20 tons English sold at 32½ @ 33 cents; Banca 38½, all gold. Plates continue in moderate demand at unchanged prices; sales have been made of 500 boxes assorted Charcoal Tin at $8.62½ for I C; 500 [illegible] Terne, part $7.75 gold; 750 do. Coke Terne; and 1500 do. Roofing Terne, to arrive, at a private sale.

COPPER.—New Sheating, Bolts, and Braziers Copper, and Yellow Metal and Bronze Sheating are steady at our quoted rates. Ingot has been in better request, but in some instances lower prices have been accepted; the sales embrace 300,000 lb. Lake Superior at 21½@21¾ cents; 500,000 lb. Tennessee, at or about 21¾; and 25,000 lb. Baltimore, 21½, cash.

STEEL.—The demand is regular and steady, but not heavy, and it is understood that the imported has the advantage of the market, in the lower selling prices, especially for low grades.

ZINC.—Spelter, Silena, 5½c., gold; Spelter, Missouri, 9½c., curr.; Sheet Zinc, foreign, to arrive, 8c., gold; Zinc White, red seal, foreign, 7½c. gold; Zinc White, American, 7c. curr.; Manganese, high grade, 4½c., curr.

Mining Stocks.

NEW YORK, March 31, 1871.

The following quotations are reported by the New York mining stock board :—

PETROLEUM STOCKS.

	BID.	ASKED.
Bergen Coal and Oil	—	—
Bennehoff Run	25	—
Blood Farm	—	—
Brevoort	40	100
Bliven Oil	25	50
Buchanan Farm	38	50
Central	55	70
Clinton	10	—
Home	150	225
Phillips Pet	—	—
Rynd Farm	30	—
United Petroleum Farms	15	—
United States	—	—
National	10	—
New York & Allegheney	—	150
Northern Light	—	—
Pithole Creek	—	—
Rathbone Oil	20	—
Second National	—	—
Sherman & B	—	—
Tarr Farm	—	—

GOLD STOCKS.

	BID.	ASKED.
Bates & Baxter	25	35
Benton	—	5
Black Hawk	—	61
Central Gold	13	15
Cons Gregory	45	57
Grass Valley	—	22
Gunnell	17	40
La Crosse	10	14
Liberty	—	—
Montana	3	—
Rocky Mount	4	5
Quartz Hill	15	20
Smith & Parmlee	35	50

San Francisco Stock Market.

A telegram from San Francisco March 30, quotes mining stocks as follows :—

Savage	65
Yellow Jacket	65
Kentuck	70
Choliar Potosi	71
Gould & Curry	61
Belcher	40
Imperial	30¾
Amador	—
Crown Point	144
Hale & Norcross	—

The Slate Trade.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE.

Vermont purple, 1st quality, per square	$6 50@ 7 00
" green, 1st " "	6 50@ 7 00
" red, 1st " "	15 00@16 00
" variegated, "	5 75@ 6 20
d. b'k and d'k blue, 1st qual., "	6 00@ 7 05

PENNSYLVANIA SLATE TRADE.

The following is a weekly statement of Roofing Slates, School Slates and Mantels, shipped from Slatington, via Lehigh Valley Railroad for last week, ending March 25, 1871.

ROOFING SLATE.	
Girard Slate Co.	70 squares.
D. Williams & Co.	— "
J. Anthony	— "
Lehigh Slate Co	— "
American Slate Co.	— "
H. Williams	— "
W. B. Williams	35 "
Jones & Town	— "
Blue Vein Slate Co	245 "
Total	350 "
SCHOOL SLATE.	
D. Williams	187 cases.
Locke Slate Co.	86 "
Lehigh Slate Co.	262 "
F. Shenton	155 "
Harper & Cortright	85 "
A. W. Lerch	26 "
Total	801 "
MANTELS.	
Yerkes & Martin	— "
Lehigh Slate Co	25 "
Total	25 "
BLACK BOARDS.	
Lehigh Slate Co	25 "
Total	25 "
BY THE L. & S. RAILROAD.	
SCHOOL SLATES.	
Heimbach Slate Co	35 "

Griffin's Railways and Tramways.

The improvements hereafter described are a further development of a system of permanent way for which letters patent were obtained in the year 1869. A modification of the rails with flanges high up on the web, secured to the present inventor by the above patent, is used, such modification consisting in forming the rail with deep web below the flanges, with the outer flange higher than the inner one; this gives with the strength necessary a lighter rail, with adequate bearing, and much greater amount of wearing surface than in ordinary sections of rails of equal weight. To give greater strength to the entire way, and to obtain the combined advantages of the longitudinal and transverse systems of railway, it is proposed to seat the longitudinal timber upon one or more transverse or partially transverse pieces of metal, which may, in some cases, form the gauge or tie bars. For this purpose, T, girder, angle, or other iron or irons cut in lengths regulated by the gauge, and perferably sufficiently long to project many inches beyond and outside the longitudinal timbers, are used. Upon such irons, chairs are formed to receive the longitudinal timber, such chairs being made by rivetting or bolting pieces of angle or other suitable iron on to the irons, or by fixing thereon jaws made to any shape which may be found preferable. It is stated that by this system of supporting longitudinal timbers upon transverse metal sleepers almost the whole of a new railway can be made from old material with the greatest facility, and at an insignificant cost, by adapting worn out and defective rails, and waste ends of the same of almost any section, for use as transverse or partially transverse sleepers, as well as almost all descriptions of T, girder, angle, or other suitable sections which may have been condemned for ordinary purposes.

For example, a "Vignoles" rail is taken, cut in suitable lengths, pieces of angle or other iron are rivetted or bolted upon its bottom to form a chair for the rail or rail and timber, and its head is laid downwards in the ballast. Or an ordinary double-headed rail is taken, the jaws being rivetted upon the ballast. Or the bridge or any other description of rail which may be found applicable to this purpose is used. It is considered important that the chairs should not be formed at the extremity of the transverse sleepers, but the ends of these sleepers should extend beyond and outside, the effect of the extension being to give a better and more steady bearing, and to check any tendency to tilt or roll in the ballast. It is preferred to use the regulating bolts for bolting the timber to sleepers thus formed, but any suitable fastening may be used. The inventor states that a way thus laid will be found really permanent, for in renewing it the solid iron transverse portion of the sleepers will require to be disturbed only at very long intervals. When a new rail or timber is necessary, either can be replaced in a few minutes, by simply withdrawing the regulating bolts. The rail bearing immediately on the timber, no packing is needed. To avoid any possibility of the nuts of the regulating bolts shaking loose, the holes in the chair jaws or metal through which they pass are a little larger than the collar upon the nuts is also flattened to the same extent on two opposite sides. When the bolt is passed through the jaw or chair, and the nut is screwed up tightly, the rail, which has always a tendency to rise, brings the flattened surfaces in the holes of the chair jaws or metal and the flattened surfaces on the collar of the nut in close contact, so that at every half turn of the nut they lock together so tightly that it would require a strong wrench of a spanner to separate them.

Queensland Telegraphy.

THE establishment of telegraphic communication in various parts of Queensland continues to make good progress. Communication over the Burdekin river has been made more secure. The span from bank to bank is nearly half a mile; a light wire strand has been substituted for the ordinary wire at this place, and, as an additional precaution, a submarine cable has been buried across the bed of the river. This cable can be made available for communication in the event of an accident to the wire strand. A station has been opened at Waterview. A line in course of construction from Cardwell to Normanton has been rapidly progressing; the first section of 50 miles was completed and opened in the course of January. The country between Cashmere and Etheridge has been explored by Mr. McMILLAN, who reports favorably upon it. The outer section from Normanton to the Etheridge is advancing rapidly, the line having been cleared for a distance of 150 miles. The Queensland Legislature has voted grants for the construction of a line from Allor *via* Seyburn to Goondiwindi, 150 miles, as well as for a line from Clermont to Springsure.—*Engineering.*

Railway Ties for South America.

THE demand for redwood ties, used in construction of railroads on the Pacific coast, it is asserted will soon exhaust the forests of California. Pine and oak ties are used to some extent, but they decay rapidly. Supplies for the South American railways are also drawn entirely from California, as the hard wood ties cut on the Andes cannot be used without boring out the spike hole holes with augurs.

Narrow Gauge Railroads.

A CIVIL engineer in Texas, advocates the construction of narraw-gauge railroads with wooden rails as adapted to thinly populated districts in Texas, where traffic is light, and it is utterly impossible to get money to construct ordinary roads. Charters have been obtained for two such roads, and they are likely to be built soon. A railroad, thirty inches wide and eleven miles long, is to be built in Greene county, Tenn., at a cost of $20,000. The rails are of wood, and to be stripped with iron.

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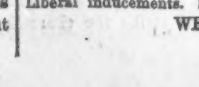

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Deep Placer Mining in California.

[Continuation.]

The Hope Gravel Company.—In the early part of 1866, the Hope Gravel Company was incorporated in San Francisco, with a capital stock of $60,000, divided into 3000 shares, and 6000 feet of ground, located on Alta Hill, was purchased; the greater part of this, however, was supposed to be worked out. A systematic exploration was commenced, which continued without any encouraging discoveries for nearly four years, when the present brilliant prospects were struck. During this period thirty-nine assessments were levied, aggregating $92,250. Hoisting works were erected; shafts sunk, abandoned and commenced again in more favorable locations; pumps and engines were replaced, until the present powerful and complete machinery was obtained, when perseverance and energy met with its reward in the striking of a channel at a point where its existence had for years been unsuspected. In sinking the various shafts of the company the following strata were found: Red loam, 10 or 12 feet; volcanic ashes, 140 to 150 feet; gravel, 4 or 6 feet; pipe clay, 60 feet; gravel, 3 to 5 feet; bed rock—slate. The present working shaft of the company was sunk to a depth of 240 feet from the surface, where it struck the rim of the "South Channel," which had been worked out by the Alta Company and Rock Tunnel Company. The main drift was run north, through the old workings, but prospecting failed to discover the continuation of the Alta Hill channel. In this direction a sandy deposit was found, and exploration ceased until Mr. BROWER, the present Superintendent, took charge of the mine. Acting on the theory that the sand was a bar or island of the old river, he ran through it one hundred and fifty feet, and was rewarded by striking the "North Channel," a distance of three hundred and fifty feet from the shaft, which proved to be virgin ground. Drifts were run east and west, on the line of the channel, which proved to be from eighty to ninety feet wide, carrying gravel equal to any taken from the Alta Company's ground. These drifts demonstrated that the water flow of this north channel was in an opposite direction to that of the south channel; the inference is that the old river took an abrupt bend, forming a horse-shoe, and left a point of sand between the old workings and the present discovery. The shaft was sunk to a sufficient depth for drainage—the water from the mine flowing in a "sump" or well at the bottom of the shaft, whence it is lifted to the surface by two ten-inch pumps, and carried to a reservoir, from which it is conveyed to the sluice boxes for washing the gravel. The loose gravel is run through a sluice consisting of sixteen boxes of twelve feet each in length, with a grade of eight inches to the box. It is then allowed to slack and is run through a second time with nearly as good results as the first. The hard cemented gravel and the quartz boulders, which are numerous in this claim, will require crushing. For this purpose an eight-stamp mill has been erected and attached to the shaft of the pumping engine. This engine is of forty horse-power, and will be used solely for the battery and pumps, as the hoisting apparatus is run by an independent engine of twenty horse-power. A contract has been let for cleaning out the old tunnels, which will drain the mine to some extent, and increase the available power of the machinery by relieving it of the duty of lifting large quantities of water. Twenty-five men are on the pay-roll, working ten-hour shifts; this force can be increased as the drifts on the channel are carried forward. Since the discovery of the north channel, the yield per week has been from sixty to one hundred ounces of gold from the sluices, besides a large amount of gravel stored up for crushing.

The success of the Hope Company has stimulated active operations along the line of this deposit, and many promising locations have been made recently, among which may be named the Hope No. 2—also a San Francisco company, which is opening ground between Alta Hill and Grass Valley. To the north and west several companies, penetrating the deposit by tunnels, are taking out pay gravel. WEBSTER & Co. are carrying on extensive operations in this direction. The lower end of this ancient stream is being sought between the Grass Valley basin and Bear river.

BETWEEN GREENHORN CREEK AND BEAR RIVER.

The Great Blue Lead is the distinctive appellation of one of the largest ancient streams of California, which is found in the counties of Sierra, Nevada and Placer. The name has been generally adopted on account of certain peculiarities of the lower strata of gravel of this channel, among which the distinguishing features are the color and hardness. The Blue Lead has had its greatest development between Greenhorn Creek and Bear River, where are located the towns of Hunt's Hill, (called Gouge-eye in early times) Red Dog, You Bet, and Little York. The peculiar nomenclature of these towns gives the traveller an unfavorable impression of the intelligence of the early miners. Such an opinion, however, is erroneous, for it must be remembered that when these places acquired their present names they were mere camps, without any prospects of growing into towns, and the names were given from some accidental local event or peculiarity to a temporary camp which subsequently acquired sufficient importance to have a post-office and express office, which had the effect of perpetuating the name, to the great disgust of the present residents.

The auriferous deposit has a general north and south course until it reaches You Bet, where it turns to the east. Its width is between half a mile and a mile, and the depth of the deposit varies from 100 to 300 feet—perhaps more at some places. The range is intersected by deep ravines and gulches emptying in Greenhorn Creek or Bear River, which in some places have been filled with tailings to such an extent as to render further hydraulic operations impossible until they are removed.

Cement Mining.—The principal interest of this region is hydraulic and cement mining. The cement mining has been carried on by tunnels run to strike the channel, which has been followed and "breasted out" where practicable. The excessive hardness of the cement makes its extraction by this means expensive, and the proceeds of a fortunate season have often been expended the next in efforts to find the lead, which is frequently lost in consequence of the winding of the channel. The channel, although carrying gold, almost uniformly, is very much "spotted," and the large returns of some of the companies have been taken from a very limited area of bed rock.

In July, 1867, there were, between Quaker Hill and Little York, nineteen mills with one hundred and sixty-four stamps, erected at an aggregate cost of $100,000, for crushing cement, of which eighty stamps were then running regularly. In October, 1870, but one of these mills, that of GOODSPEED & Co., at Hunt's Hill, was running regularly, and two or three others at intervals. Hydraulic operations are also suspended at all these points, except Little York, on account of the scarcity of water this season, which has been remarkable for its dryness, but it is probable that next year this branch of mining will be more extensively engaged in, at points where outlet is practicable, than for many years past. The owners of the cement claims formerly worked by mills are fitting up hydraulic apparatus for washing off the dirt down to the cemented gravel, and will not resume crushing until this top dirt is run off, when they can pursue this business free from the disadvantages and expense of underground workings. The hydraulic dirt is rich enough to pay well at present rates of water (12½ cents per inch) with the improved machinery now in use, and it is an absolute certainty that the bottom will pay largely when it can be mined and crushed without the expenses incident to underground operations. Taking the aggregate results of channel mining, by means of tunnels and drifts, on this range, we should find that it has not been a profitable business considering the amount of capital invested, although some of the claims near You Bet have at seasons yielded almost fabulous returns.

Hydraulic Mining.—At Red Dog, operations are necessarily suspended for want of an outlet. At You Bet, WILLIAMS & Co., BROWN & Co., NEECE & WEST, and the owners of the Hydelauff ground (all of these mill owners), are preparing for hydraulic operations in 1871. At Quaker Hill, Messrs. A. A. SARGENT and N. B. JACOBS own extensive hydraulic ground, which is worked with all the improved appliances. These gentlemen have suspended crushing at their mill (the Green Mountain). Chalk Bluff, on the east side of the range, has been noted for the large quantities of silicified wood found in its washings at a depth of 150 to 200 feet—specimens of this may be found in all the mineral cabinets of California, and many of those in the Eastern States. In May, 1866, S. N. STRANAHAN & Co. located an extensive claim on Chalk Mountain ridge, commencing near You Bet and following up the centre of the ridge ten miles, having an average width of one mile. They have expended about $45,000 on this ground—the greater part of which was disbursed in perfecting the title. No work has been done on this claim for the past year, but operations will be resumed in the spring of 1871 at four different points. A section of this claim from openings at various localities, shows the following strata: Lava, overlaid with a few feet of soil, 200 feet; volcanic ashes and debris, 200 feet; pipe clay, 150 feet; white gravel, 200 feet; blue gravel, 10 to 50 feet; bed rock, hard slate. The overlying lava appears only high up on the ridge, and does not come down as far as the towns named. The country in the vicinity of the headwaters of Greenhorn and Deer creeks contains immense deposits of gravel which have not been systematically worked for want of capital.

The towns on this range have greatly changed in appearance since 1867. Red Dog and You Bet have been destroyed by fire. The first named town will not be rebuilt, former residents having removed to You Bet, less than a mile distant. Little York, then a decaying town, now presents a lively and prosperous appearance, the effects of the consolidation of most of the ground in a large company.

River Sluicing—The future of the region under consideration will depend to a great degree on finding an outlet for its vast quantity of hydraulic dirt. This can be obtained in some places by bed-rock tunnels, but at other points these are impracticable, and effectual outlet can only be had by emptying the streams and gulches of their vast accumulation of tailings. As an example of the extent of these accumulations, we will take Bear river. This stream has been filled to a depth of nearly eighty feet in the centre and its banks so far widened that tall pine trees, formerly far above the stream, have been gradually engulfed, season after season, until now only the top branches appear above the current. It is believed that these tailings contain enough gold and quicksilver to pay a handsome profit for their removal, if an outlet could be found. A few years since a San Francisco company laid a flume in the bed of Greenhorn creek, commencing at a point where a natural fall existed, with the intention of washing out the tailings, but an unusual flood of water broke up the boxes the first season, and the enterprise was not resumed, although pronounced feasible and profitable by all the miners of this vicinity. Mr. WREN, of Dutch Flat, a civil engineer and surveyor, has made a reconnoisance of the country between Bear river and the North Fork of the American river, and states that a tunnel could be run through the divide between these streams which would not exceed in length one and a half miles. As the American river runs through a gorge several hundred feet lower than Bear river, this tunnel would empty Bear river and its tributaries and open millions of cubic yards of hydraulic ground now without outlet, which otherwise can never yield up its wealth. The quantity of tailings in Bear river and its confluent gulches alone, above the mouth of the supposed tunnel, estimating on an average width of 300 feet, a depth of 75 feet, and a length of ten miles, would be 44,000,000 cubic yards. We know that in early times a large proportion of the gold and quicksilver was lost—perhaps 20 per cent. would be too low an estimate of such losses. Of late years the proportion of gold and quicksilver carried off in the tailings has been smaller—the amount could be approximated by careful calculations of the results of the cleaning up of the last system of undercurrents and tail sluices of the claims emptying into this river, and by some experiments at favorable points. Let us suppose, however, that the general average of the tailings will reach 2½ cents per cubic yard, we have an aggregate of $1,100,000, to save which we must construct a tunnel of say 8000 feet, lay it in flume, and place it in condition for running off the tailings. With the present facilities for running tunnels, by means of compressed air, diamond drills and giant powder, we should not estimate the expense per lineal foot at over $10 or $12—the rock being an easily worked slate—which would give an aggregate of $100,000. Allow $50,000 for putting in flume and incidental expenses, and we have a total cost of $150,000. Now, if fifty per cent. of the gross amount estimated to be in the river can be saved, we have a result of $550,000, less the expense of cleaning up and original cost of tunnel. The contents of these tailings have been estimated by Mr. WREN and others at much higher figures than above. After the tailings were run off, the tunnel would be valuable property as a tail-sluice outlet for many square miles of hydraulic ground. We have made the calculation out of curiosity, but think this is one of the profitable mining enterprises of the future.

The Little York Mining and Water Company.—This is the most extensive mining operation between Greenhorn and Bear river. The company was formed two years since, and has purchased and consolidated mining ground covering an area of about two hundred and forty acres, one half of which is located at Little York, and the balance at Liberty Hill and Christmas Hill, a few miles distant. In addition to the ground thus acquired, they have purchased the ditches and water right of THOS. GARDNER and PATTERSON and MAGUIRE, three ditches with an aggregate length of forty-five miles, and having sufficient capacity to supply three thousand inches of water. The width of the Blue Lead, which underlies all the ground at Little York, is from 300 to 500 feet, but the auriferous deposit has a surface width of about one mile. The average height of the banks from bed-rock to surface is 160 or 180 feet, of which from twenty to forty feet is hard cement. The company have two mills for crushing cement, but this treatment has been abandoned on account of the superior facilities enjoyed here for the construction of a system of dumps, which serve to effectually break up and disintegrate the hardest cement, these claims having outlet both on Bear river and Steep Hollow, with at least 600 feet of fall to either stream. They have nearly 10,000 feet of flume, four to six feet wide, and nearly four miles of iron pipe for conveying water from their ditches to the ground. The company are running but a few hundred inches, but will run 2500 inches next season with the newly-invented hydraulic nozzles, when they expect to take out from $12,000 to $15,000 per month. The past season has yielded $7000 to $10,000 per month. Water is sold here at nine cents per inch, being cheaper than at any other locality in the State.

W. A. S.

The Gas Supply of Vienna.

FROM a recent Austrian engineering publication, we learn that the contract between the city government of Vienna and the Imperial Continental Gas Association, an English company which has for years supplied the city with gas, will expire within six years. The question of renewing the contract, or of the city's constructing gas-works, has been discussed by a committee of the Austrian Engineers and Architects' Association, and a long report made upon the subject.

The company made, in the year 1869, eight hundred and sixty million cubic feet of gas, and the loss by leakage was reckoned at seventeen per cent. The committee think that ten per cent. ought to cover all losses, if the street pipes were properly laid and attended to. They think that the city government should look into this matter for sanitary reasons. The escape into the ground of such an amount of gas they consider very unhealthy. The gas now costs the city for the street lamps 3 fl. 50 kr. (about $1 75) per thousand cubic feet, and private consumers 4 fl. (about $2) per thousand. Experts think that gas could be made, and six per cent. interest paid upon the capital invested, at from 2½ to 2¾ fls. ($1 25—$1 37) per thousand feet.

The illuminating power of the gas, and the question whether a gas flame consuming five cubic feet per hour should give more light than twelve standard candles, were also discussed. The majority of the experts considered the present standard sufficiently high, and did not favor a raising of the standard in this respect. One, however, thought that fifteen-candle power should be given by a five-foot burner, and that by a combination of the best gas coals, this result could be reached without materially increasing the expense.

The subject is interesting, as illustrative of the proverbial German thrift. They earnestly discuss a question six years before they will be called upon to act in the matter.

Cement for Fastening Instruments in Handles.

A material for fastening knives and forks into their handles, when they have become loosened by use, is a much-needed article. The best cement for this purpose consists of one pound of colophony (purchasable at the druggists) and eight ounces of sulphur, which are to be melted together and either kept in bars or reduced to powder. One quart of the powder is to be mixed with half a quart of iron filings, fine sand, or brick dust, and the cavity of the handle is then to be filled with this mixture. The stem of the knife or fork is then to be heated and inserted into the cavity; and when cold it will be found fixed in its place with great tenacity.

THE ENGINEERING AND MINING JOURNAL.

CONTENTS FOR THIS WEEK.

[*Illustrated Articles are marked with an asterisk.*]

Polytechnic Club of the American Institute	209	Exter Railway Brake	215
Amalgamated Copper Plates	210	The San Francisco Mining Stock Market	215
Boards of Arbitration	211	Deep Placer Mining in California	216
Canadian Iron Production	211	The Gas Supply of Vienna	216
The Toughness of Iron and Steel at different Temperatures	211	Cement for Fastening Instruments in Handles	216
Application of Compressed Air to Mining	211	EDITORIALS:	
A Year's Railway Slaughter	212	Geology of White Pine	217
Complete Skeleton of an Ichthyosaurus	212	The Pneumatic Tunnel	217
The Cornish Miner	212	The Coal and Iron Deposits of Great Britain and West Virginia	217
MINING SUMMARY	212	OFFICIAL LIST OF PATENTS	218
MARKET REVIEW	212	Important to Inventors	219
THE SLATE TRADE	215	Advertisements	220

ROSSITER W. RAYMOND, Ph. D., Editor.

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Geology of White Pine.

Mr. ARNOLD HAGUE, a brother of Prof. J. D. HAGUE, contributes to the volume on Mining Industry of the Report of the U. S. Geological Exploration of the 40th Parallel, a chapter on the geology of the White Pine district, which is highly interesting and valuable as the first careful and complete account furnished of the subject. The substance of Mr. HAGUE's conclusions will be here given.

The White Pine mountains are a southerly continuation of the Humboldt chain, though between White Pine and the Humboldt river there is an interval of depression, where the range sinks to low and insignificant limestone folds or ridges. For a hundred miles south of the river, however, the line of rugged peaks rises 5,000 or 6,000 feet above the plain; and at White Pine there is another culmination in Pogonip peak, while six miles further south the mountains are quite low again. The White Pine district, twelve miles square, with Treasure hill as a central point, lies therefore in a somewhat isolated mountain group. This group is divided into three north and south ridges, measuring in width between the two outer crests about 5½ miles. These ridges are, first, Pogonip ridge on the west; second, the middle ridge, comprising Treasure hill, the Base Metal range, and the Blue ridge: third, Mokomoke, on the east. The highest peak, Pogonip mountain, is 10,792 feet above sea-level; Telegraph peak, on Treasure hill, is 9,228 feet; Treasure city, 8,980 feet; Hamilton, 8.003 feet; and Mokomoke, 9,239 feet.

Pogonip ridge trends nearly north and south. The eastern slope presents a grayish-blue limestone, striking with the trend of the ridge, and dipping 22° to 25° eastward. But few and imperfect fossils have been found in it, presenting forms allied to those of Treasure hill. Mokomoke likewise presents a simple geological structure, the rocks being perfectly conformable, trending north and south with the ridge, and dipping 22° east, except in that part above the saddle connecting with Treasure hill, where the rocks (sandstone and limestone) are considerably distorted.

Between Pogonip and Mokomoke is the middle ridge, which is at once the most complicated in its geological features and the most important from its mineral wealth. It presents in structure, first, a well-marked anticlinal fold, the axis of which has a general north and south direction; and, secondly, a transverse fracture and displacement, which extends across the ridge at the southern end of Treasure hill.

The axis of the anticlinal forms the cañon between the Base Metal range and the Blue ridge; then, bending around the north end of Telegraph peak, continues along the east slope of Treasure hill, five hundred feet below the summit, through Pocotillo. This fold is in limestones, the western slope of which constitutes the west side of Treasure hill and the Base Metal range, with the exception of the caps of Telegraph peak and the northern slope of Babylon hill, which present overlying shale and silicious limestone. These westerly dipping beds form, with Pogonip ridge, a synclinal fold.

Treasure hill is about one mile and a quarter in length, and, across Treasure peak, one mile and three-quarters wide. On the north it descends steeply 975 feet to the town of Hamilton; on the east, a precipitous wall, 400 feet in height, descends to Pocotillo. Bromide, Chloride and Pogonip flats are floors of bedded limestone on the west slope, about 200 feet below the crest, the strata dipping 7° to 10° westward. Together, they are a little over a quarter of a mile long, by about 550 feet broad, and they terminate on the lower side in a cliff 150 to 200 feet high, below which the strata, much disturbed, strike to the bottom of Silver cañon.

Pogonip flat, the southermost of the three, terminates in a low escarpment, at the foot of which occurs the transverse fracture and displacement of strata already referred to. It extends, nearly at right angles with the anticlinal axis, entirely across the ridge, contains the Eberhardt deposit, and has given rise to two small cross-cañons. South of this fracture the formation is much broken up by local displacements and sharp folds.

Nowhere in the district do the beds underlying the limestone crop out. The thickness of the formation therefore cannot be determined, but there are at least 1,500 feet of it exposed. The uppermost beds are highly fossiliferous, and belong without doubt to the Devonian period. The limestone is bluish-gray, hard and compact, highly impregnated with foreign matters, particularly silica, in the neighborhood of the ore-deposits, but elsewhere remarkably pure, containing (by analysis of a specimen from the east bluff of Treasure hill) 99 per cent. of carbonate of lime.

Immediately overlying this Devonian limestone is a formation of thinly laminated calcareous shale, dark-gray, interstratified with thin reddish-gray layers, and, so far as known, entirely non-fossiliferous. It has been removed by erosion from the greater part of Treasure hill, but is found in the depression between Treasure and Telegraph peaks, underlies the summit of the latter, may be traced along the western slope, dipping conformably with the limestone, and appears in a thickness of 125 feet on the east side, immediately above Applegarth cañon.

Over this calcareous shale is a granular, silicious limestone, containing nodules, and frequently whole strata which have been completely metamorphosed into chert. The formation is about 100 feet thick, and abounds in crinoids. The top of Telegraph peak is composed of this cherty limestone. The calcareous shale and silicious limestone occur also on the summit of the Base metal range, and on the east side of the anticlinal fold, along the base of the Blue ridge, overlying the Devonian limestone. They are ascribed to the same geological period.

The next overlying formation is a black argillaceous shale, about 600 feet thick, carrying seams of bituminous matter, and furnishing most of the springs of water found in the district. Hamilton is in this formation. Above it, as observed on Mokomoke mountain and elsewhere, occurs a belt of fine-grained reddish yellow sandstone, having an estimated thickness of 300 feet, and above this again a body of light-yellow, granular limestone, of which several hundred feet are exposed, but the entire thickness cannot be determined, as the overlying rocks nowhere appear. It is rich in well-marked Carboniferous fossils; and the black shale and sandstone are referred, with it, to the Carboniferous period, though it is not possible from the data already obtained, to say positively more than this: that the lower limestones of White Pine are Devonian, and the uppermost, Carboniferous; while the intervening shale, chert, black shale and sandstone must belong to one or the other of these periods.

The ore-deposits thus far discovered are confined exclusively to the Devonian limestone. The highest stratigraphical position occupied by any mineral deposit yet found is along the line of contact between the limestone and the overlying calcareous shale. The mines at the north end of Treasure hill, such as the Mammoth, Original Hidden Treasure, etc., occupy this position.

But Mr. HAGUE's classification of the White Pine ore-deposits, and his theory of their genesis, must be reserved for discussion hereafter. We have to thank him for a clear and simple statement of the geological structure of a district about which much nonsense has been written by amateurs. The text of his description is illustrated with geological maps and sections, which impress, even more forcibly than his words, upon the mind of one at all familiar with the locality, a conviction of the general accuracy of his conclusions upon this subject.

It will be seen that, according to these conclusions, the rocks of Treasure hill are bent or broken over an anticlinal axis, and, on the east, dip under the rocks of the Mokomoke range. This explains the absence of silver ore in the latter range. In 1868, Mr. RAYMOND called attention to a probable anticlinal in Applegarth cañon; but as he made no collection or examination of fossils, and did not carefully study the dip of the strata at the bottom of the cañon, he committed the error of supposing the lower limestones of Treasure hill to be the same as those of the range eastward, thus locating the axis of the fold too far to the east; and this led to the expression on page 36 of his report of 1869, "Across the cañon to the eastward the precipitous face of a parallel range shows the continuations of the limestone strata; but the range is of inferior height, and the upper metalliferous layer is consequently wanting, having probably been carried away by denudation. This range dips eastward; and the cañon between it and Treasure hill probably occupies an anticlinal axis."

Mr. HAGUE's correction of this erroneous deduction from partial data shows the advantage of careful instrumental surveys and of the collation of palæontological evidence. The matter is not wholly theoretical in value. If certain layers of rock on Treasure hill are impregnated with silver deposits, it is surely of practical importance to determine whether their continuation may be sought for in the neighborhood, and whether the outcropping rocks of the vicinity are above or below the desired argentiferous formation.

The Pneumatic Tunnel.

THE Pneumatic Tunnel scheme of Mr. BEACH and his associates, embodied in an appropriate bill, has passed both houses of the Legislature, and now awaits the decision of the Governor. Its opponents have brought forward some striking proofs of the inadequacy of the pneumatic motor for purposes even of package-transportation, still more of passenger-travel. According to the reports of various engineers, it appears that the greatest difficulty has been experienced in making a tight joint between the car and the sides of the pneumatic tube. Vulcanized rubber rings and brushes of hogs' bristles have been employed in the endeavor to make a joint which should at least practically prevent the escape of air around the car. These devices, however, were found to possess but little durability, besides creating a great frictional resistance. We might, if necessary, find other reasons to account for the abandonment of the pneumatic tubes by nearly all of the English dispatch companies, but we will confine ourselves to the enumeration of some of the pneumatic tubes which have been abandoned in London.

In the first place, a tube was operated for some time at the Crystal Palace at Sydenham, for the entertainment of visitors; but both tube and works disappeared some years ago. The Pneumatic Dispatch Co. operated for several years a tube four and a half feet in diameter and over a mile in length. The company was, however, finally dissolved, and the Metropolitan Board of Trade recently ordered the removal of the tube. "The Whitehall Railway Company" was chartered by Parliament in 1864, and was to have been operated on the pneumatic principle, under the Thames embankment and for a short distance under the river itself. The tubes of the company were thirteen feet in diameter. Although the operations of this company were commenced with considerable flourish of trumpets and cost a large amount of money, the undertaking did not meet with public confidence, and the company failed to accomplish its object. The removal of the lumber which this company left in the river has been ordered by the Board of Conservators of the Thames, on account of the obstruction which it offers to their operations. In the iron tunnel recently completed under the Thames by the "Tower Subway Company," and which was as well adapted to the application of the pneumatic principle as any that has been built, the idea of employing it was not even suggested.

In short lines it has been proved that eighteen or twenty per cent. of the power employed to drive the blowers can be recovered in useful work in propelling the cars, or dispatch boxes. How much of this power could be utilized in a tube eight or ten miles long must be left for computation, or the more rapid if less accurate Yankee system of guessing. We do not expect to see the problem practically solved.

In reply to all these objections, it may be remarked that the Pneumatic Tunnel people appear to know them as well as anybody, and have shrewdly got a provision incorporated in their bill authorizing them to use steam if they find it better—as they undoubtedly will. The scheme resolves itself, therefore, into another subterranean steam railway, and comes thus into competition with the Central Underground, already chartered. That company protests against the interference, and promises to do something under its charter if certain amendments for which it has applied are only granted. But people have lost faith in the Central Underground, and believe it never will be carried out.

No one seems to know at the time of this writing what will be the Governor's decision. For ourselves we are indifferent, feeling convinced that something more than charters and schemes of speculators is needed to solve the problem of city transit. We make the least economical use of the land and water-ways already at our disposal; and our engineers, instead of discussing the whole subject, to unite on the best plans, employ themselves in demonstrating the impracticability of every plan suggested.

The Coal and Iron Deposits of Great Britain and West Virginia.

FROM a recently published report on the "Mineral and Agricultural Resources of the Kanawha Valley," by HOWELL FISHER, geologist and mining engineer, we extract the following interesting comparison of the coal deposits of Virginia with those of Great Britain:

"The coal area naturally depending upon the New River and Kanawha Valleys of West Virginia for its outlet (in fact by its contour inaccessible by other passable outlets) embraces a territory of over six thousand square miles, the extent of which is more readily comprehended when the fact is stated that it is quite equal in superficial extent to the whole productive coal area of Great Britain, from which is now mined over one hundred million tons of coal per annum. The great variety and fine quality of the coal of the middle sections of this field are well known and frequently attested. The fine, fatty bituminous, the splint and the cannel, are the principal varieties. The work, 'Coal, Iron and Oil,' by DADDOW & BANNAN, edition of 1866, page 34, speaking of this location and its coal, says: 'Coal river, Elk river and Gauley diverge from the great Kanawha, and spread their branches over one of the richest and most magnificent coal regions in the world, and bring down their wealth to one common centre on the Great Kanawha. The coals of this region generally are better, purer and more available for all the requirements of trade and manufacture, than the coal from any other portion of the Alleghany coal-field. The seams of coal are more numerous and their thickness greater than in any other portion of this coal-field; it can be mined cheaper, and with more economy generally, under the same rates of labor, than in any other region in this country, without exception.' The peculiar splint coal of this section is a superior fuel in its raw state for the manufacture of pig iron. Statistics of analysis made show the Kanawha coal to be among the purest found in the world. The number of workable beds is variously stated from seven to fourteen. There are five items that affect the value of a coal-field: First, quality of the coal second, quantity; third, accessibility of the coal itself; fourth, market. The last, one of the most essential, will be given to this region by the Chesapeake and Ohio railroad. In the third

item, the most essential to cheap and profitable working, this region stands unrivalled. It has been stated before that the chasm of the river renders it most peculiar service in its relation to the coal. Cutting all the coal strata for nearly its whole length entirely through, and getting down among the shales under the coal, this river has caused the numerous streams which pierce this whole coal region to cut down through most of the coal-bearing strata on their courses, leaving the coal entirely above water level, accessible at hundreds of points by simply scraping off the surface soil; so that, so far as the mere getting of the coal is concerned, two thousand dollars will open a mine ready to ship one thousand tons per week. There is no region in the world where less physical labor will prepare a mine for delivery of coal at the drift's mouth.

This will be made clearer by a comparison of the position of coal here and in Great Britain in this respect. In Great Britain, and in fact in almost all of the European coal fields, the coal is deep below the water level. To reach the seams, requires the expenditure of years of labor and vast sums of money in sinking shafts or pits, and in erecting pumping and hoisting machinery, to be maintained and renewed at heavy annual expense. It is authoritatively stated that the cost of sinking shafts in the Newcastle region of England to the depth of one thousand feet has been, in many instances, one thousand dollars per yard. In the great northern coal field of Great Britain, producing twenty million tons per annum, there are two hundred pits or shafts, costing in first outlay for sinking and machinery, fifty millions of dollars, to which must be added the necessary expense, of constructing and maintaining proper air courses and their accessories requisite to the safety of the employees. There are now invested, simply in pits and machinery for pumping and hoisting the one hundred million tons produced in Great Britain, two hundred million dollars, and this vast sum is destined to utter destruction in serving the purpose for which it was used. These pits and machinery being constructed, they involve a certain amount of labor for every ton of coal got, in addition to their cost and renewal. Now, in this great coal field, crossed by the Chesapeake and Ohio Railroad, nature has already sunk all necessary pits and shafts, which need neither repair, renewal, or labor to work them. The laws of gravity have provided the most perfect, permanent, and costless pumping machinery; and the most perfect ventilation of the mines and safety of the employees, instead of requiring scientific knowledge and anxious thought, is simply a matter of the most ordinary care, the almost perfect freedom from noxious gases being the natural result of the position of the coal strata."

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112,926.—HOLLOW-TILE FLOOR.—George H. Johnson and B. Kreischer, New York, N. Y.
112,927.—RESERVOIR FOR GRAIN AND OTHER MATERIALS.—G. H. Johnson and Balthasar Kreischer, New York, N. Y.
112,928.—FIRE-ESCAPE.—C. P. Kenyon, Selma, N. C., assignor to himself and J. W. Sharp, same place.
112,929.—COMPOSITION-TILE FOR FIRE-PROOFING BUILDINGS.—Balthasar Kreischer, New York, N. Y.
112,930.—HOLLOW-TILE.—Balthasar Kreischer, New York, N.Y.
112,931.—STOVE-PIPE SHELF AND CLOTHES-DRIER.—G. W. Langdon, Greene, N. Y., assignor to himself and Lewis Seneare, same place.
112,932.—BELL-HANGING.—Auguste Laroy, Sas Slykens, near Ostend, Belgium.
112,933.—LEGGOTYPING.—William Augustus Leggo, Montreal, Canada.
112,934.—HINGE.—Martin R. Lemman, Hamilton, Ohio.
112,935.—WOOD-SCREW.—Andrew B. Lipsey, West Hoboken, N. J.
112,936.—BASE-BURNING STOVE.—L. Litchfield, Gouverneur, N. Y., assignor to himself and Horace K. Osborne, Arlington, Mass.
112,937.—TRAVELING-TRUNK.—John C. Locke, Rochester, N.Y.
112,938.—CHAIN FOR HANGING SASH.—Michael Magrath, New York, N. Y.
112,939.—BOAT-LOWERING APPARATUS.—George W. Mallory, Mystic Bridge, Conn.
112,940.—HARVESTER-RAKE.—John P. Manny, Rockford, Ill.
112,941.—HARVESTER-RAKE.—John P. Manny, Rockford, Ill.
112,942.—HARVESTER.—John P. Manny, Rockford, Ill.
112,943.—SAW WITH DETACHABLE TEETH.—Thos. P. Marshall, Trenton, N. J.
112,944.—APPARATUS FOR MANUFACTURING WIRE.—Benjamin A. Mason, New York, N. Y., assignor to Thomas L. Carpenter, same place.
112,945.—WOOD-PAVEMENT.—Gordon A. May, Chicago, Ill.
112,946.—BRAIDING-MACHINE.—John McCahey and Stephen B. Salisbury, Providence, R. I., assignors to the New England Butt Company, same place.
112,947.—BUCKLE.—Duncan McMillian and Abraham Rowan, Webster City, Iowa.
112,948, antedated March 10, 1871.—STEAMING ATTACHMENT FOR KEROSENE STOVES.—Robert B. Mitchell, Chicago, Ill.
112,949.—MOLDING-PLANE.—Ellis H. Morris, Canton, Ohio.
112,950.—KEEP AND BRACE FOR FIFTH-WHEELS.—F. B. Morse, Plantsville, Conn., assignor to H. D. Smith & Co., same place.
112,951.—PENCIL-SHARPENER.—Elias P. Needham. New York, N. Y.
112,952.—ANKLE-BRACE.—Jacob S. Niswander, Oakland, Cal.
112,953.—PIE-CASE.—Henry H. Olds, New Haven, Conn.
112,954.—CAR-BRAKE AND STARTER.—Joseph Caradis, Brooklyn, N. Y., assignor to himself and Sarah Parker, same place.
112,955.—LIFTER FOR FRUIT-JAR.—Stephen R. Pickney, New York, N. Y.
112,956.—GATE FOR TURBINE WATER-WHEEL.—Samuel A. Prescott. Sutton, Mass.
112,957.—APPARATUS FOR ESTABLISHING ELECTRICAL COMMUNICATION IN RAILROAD-TRAINS.—Pierre Désiré Prud'homme, Paris, France, assignor to Charles De Frondat and Alfred Michant, Boston, Mass.
112,958.—PIPE-COUPLING.—Joseph B. Ramp, Cuyahoga Falls, Ohio.
112,959.—PRESSED-FRUIT LIFTER.—Ennis A. Raymond, Waterloo, Iowa.
112,960.—BROOM.—Charles L. Reid, Louisville, Ky.
112,961.—PORTABLE FURNACE.—J. Reynolds, Philadelphia, Pa.
112,962.—REVERSIBLE BOOT-HEEL.—Frederick Richardson and Francis Hacker, Providence, R. I., assignors to Reversible Boot-Heel Company, same place.
112,963.—FRUIT-DRIER AND FOOD-WARMER.—Seelye Richmond, Annapolis, Md., assignor of one-half his right to Joseph E. Dickson, same place.
112,964, antedated March 13, 1871.—TILE-STOVE.—Edward Y. Robbins, Cincinnati, Ohio.
112,965.—PORTABLE-FURNCE.—William D. Robertson, Knoxville, Tenn.
112,966.—HAY AND COTTON-PRESS.—C. A. Robinson, Florence, Ind.
112,967.—MACHINE FOR HUSKING CORN.—Jacob Russell, Brooklyn, N. Y.
112,968.—END-GATE FOR WAGONS.—Frederick Sener, Lancaster, Pa.
112,969.—HYDRAULIC-NOZZLE.—Henry Shaw, Nevada City, Cal.
112,970.—SAW-SET AND FILER.—Thomas P. Shaw, Omaha, Neb.
112,971.—TURNING-LATHE.—Samuel D. Sheldon, Fitchburg, Mass.
112,972.—SHAFT-COUPLING.—James Sherry, Watertown, N. Y.
112,973.—MANUFACTURE OF EYELET-STOCK.—Stephen N. Smith, Providence, R. I.
112,974.—HOLDER FOR DRINKING-GLASSES.—John V. Snider, Philadelphia, Pa.
112,975, antedated March 10, 1871.—GAS-MACHINE.—Theodore G. Springer, St. Louis, Mo.
112,976.—WHISK-BROOM.—G. Stackpole, Elizabeth, N. J.
112,977.—CHEESE-HOOP.—William Sternberg, Bridgeport, N.Y.
112,978.—HINGE FOR SEWING-MACHINES.—Roswell H. St. John, Bellefontaine, Ohio,
112,979, antedated March 14, 1871.—SAW-GUMMER.—Nathaniel F. Stone, deceased (Amanda Stone and Benjamin Holbrook, administrators), Chicago, Ill.
112,980.—NEEDLE FOR SEWING-MACHINES.—Edwin Straiu, Newton, Mass.
112,981.—HYDROCARBON GAS APPARATUS.—Myron H. Strong and William I. Reid, Brooklyn, N. Y.
112,982.—FIRE-ESCAPE.—Thomas L. Summeril, Juda, Wis.
112,983.—SOAP-DISH.—John Merritt Thatcher, Bergen, N. J.
112,984.—BOOK-SUPPORT.—S. Millett Thompson, Providence, R. I.
112,985.—SASH-HOLDER.—Alexander Thompson, Champaign, Ill.
112,986.—FIRE-PLACE GRATE.—James W. Thorniley, New Brighton, Pa.
112,987.—ALARM LOCK.—James Harry Thorp, New York, N. Y.
112,988.—ELASTIC ROLL.—William H. Towers, Boston, Mass.
112,989.—THILL-COUPLING.—Charles Twombly, Boston, Mass.
113,990.—WALKING CULTIVATOR.—John Vanluvance and Hugh Smith, Moline, Ill.
112,991.—APPARATUS FOR CONVERTING RECIPROCATING INTO ROTARY MOTION.—Franz Wagner, New York, N. Y.
112,992.—METER.—Franz Wagner, New York, N. Y.
112,993.—COOKING STOVE.—George W. Walker, Boston, Mass.
112,994.—CULTIVATOR.—Francis N. Welden, Rockford, Ill.
112,995.—FUEL AND KINDLING WOOD.—Woodward E. Wertenbaker, Washington, D. C.
112,996.—ZINC-BOARD FOR STOVES.—William Westlake, Chicago, Ill.
112,997.—BREECH-LOADING FIRE-ARM.—Eli Whitney, New Haven, Conn.
112,998.—RAILWAY-RAIL AND CHAIR.—William Edward Winby, Edgbaston, England.
112,999.—SHIP'S COMPASS.—George W. Wood, Brooklyn, N.Y., assignor to Marion A. Wood, same place.
113,000, antedated February 14, 1871.—TYING BROOMS AND BRUSHES.—James H. Anderson, Terre Haute, Ind., assignor to Thomas Marston, Jr., Walter L. Peck, and Clarence I. Peck, Chicago, Ill.

LIST OF PATENTS FOR THE WEEK ENDING MARCH 28, 1871.

113,001.—FLOOD-GATE.—August H. Adams, Piqua, Ohio.
113,002.—APPARATUS FOR OPERATING RAILWAY SWITCHES.—J. Alcorn, Charlestown, Mass., assignor to George K. Kelso, same place.
113,003.—PLANE-STOCK.—Leonard Bailey, New Britain, Conn.
113,004.—PATCH FOR RAILROAD-RAILS.—J. T. Barnett, Decatur, Ill.
113,005.—ROTARY STEAM-ENGINE.—Wm. Barry, Carthage, N.Y.
113,006.—WOOD SCREWS.—J. A. Bidwell, East Boston, Mass.
113,007.—COMBINED BORDERING AND DRAIN-TILE.—Chas. Biehl, Albany, N. Y.
113,008.—AWL FOR HEEL-MACHINES.—Horace H. Bigelow, Worcester, Mass.
113,009.—MACHINE FOR TURNING RANDS FOR SHOES.—Horace H. Bigelow, Worcester, Mass.
113,010.—NEEDLE FOR SEWING-MACHINES.—Jos. B. Blanchard, Boston, Mass.
113,011.—CULINARY-BOILER.—Peter Boesen and Michael Bedessem, Kenosha, Wis.
113,012.—LOUNGE-BED.—John Brada, New York, N. Y.
113,013.—DUMPING-CAR.—Daniel J. Brimmer, North Petersburg, assignor to Martin E. Brimmer, Rensselaer county, N. Y.
113,014.—MANUFACTURE OF WHITE-LEAD.—Ludwig Brumlen, Hoboken, N. J.
113,015.—INDEX.—O. Flagg Bullard, Media, Pa.
113,016.—REGULATING CLASP FOR ELASTIC TUBES.—Wm. Bunce, Oberlin, Ohio.
113,017.—LIQUID-METER.—Anna Buttner, administratrix of the estate of Friedrich Buttner, New York, N. Y.
113,018.—CORN-PLANTER.—James B. Conaty and Milton Catt, Indianapolis, Ind.
113,019.—CULTIVATOR.—Lee W. Conner and R. G. Conner, Troy, Iowa.
113,020.—GATE.—James B. Cotton, Dayton, Ohio.
113,021.—CONDENSER FOR STEAM-ENGINES.—William Craig, Newark, N. J., and Henry L. Breevort, Brooklyn, N. Y.
113,022.—GRAIN-DRILL.—Jesse W. Craven and Albert Clark, Centre Valley, Ind.
113,023.—APPARATUS FOR PURIFYING COAL-OIL.—Ben. Crawford, Allegheny, Pa.
113,024.—WASHING-MACHINE.—Elias Crick, Phillipsburg, N. J.
113,025.—STEERING-APPARATUS.—Alonzo G. Crossman, Huntington, N. Y.
113,026.—PAPER-CLIP.—Jacob M. Crull, Harrisburg, Pa., assignor of one-half his right to George S. Crull, same place.
113,027.—NEEDLE-HOLDER AND TENSION DEVICE FOR SEWING-MACHINES.—Edwin L. Crumb, South West. Pa.
113,028.—STOP-MOTION FOR WARPING-MACHINES.—Edwin H. Cummings, Lewiston, Me., and Grimshaw Heyes and Thos. Entwistle, Accrington, England.
113,029.—NAIL-PLATE ROLLING.—Orville C. Dewey, Joseph Dudley and Friedrich Dindemann, Wheeling, W. Va.
113,030.—BRIDGE.—Ferdinand Dieckmann, Cincinnati, Ohio.
113,031.—DEVICE FOR PIERCING AND LINING EARS FOR THE RECEPTION OF EAR-RINGS.—William Charles Edge, Newark, N. J.
113,032.—PURCHASE FOR CAPSTANS.—Joseph Edgecomb, Gardiner, Me.
113,033.—PRINTING-TELEGRAPH APPARATUS.—Thos. A. Edison, Newark, N. J.
113,034.—PRINTING-TELEGRAPH APPARATUS.—Thos. A. Edison, Newark, N. J., assignor to the Gold and Stock Telegraph Company, New York city.
113,035.—FLOWER-STAND.—Garrett Erkson, Brooklyn, N. Y.
113,036.—ELECTRO-MAGNETIC BURGLAR-ALARM.—W. E. Facer, Philadelphia, Pa.
113,037.—WATER-GRATE BAR.—William H. Farris, Cairo, Ill.
113,038.—HAND-TURNING AND BORING-MACHINE.—John Franklin Finger, Wilmington, N. C.
113,039.—PITMAN-ROD CONNECTION.—Edward G. Fish, Colfax, Iowa.
113,040.—COATING IRON AND STEEL WITH MOLTEN IRON.—Rufus B. Fowler and Daniel F. Brandon, Chicago, Ill.
113,041.—MECHANICAL TELEGRAPH-INSTRUMENT.—J. Gamble, San Francisco, Cal.
113,042.—SCROLL-SAW.—William Gardner, Glen Gardner Station, (Clarksville Post Office,) N. J.
113,043, antedated March 23, 1871.—STAVE-SAWING MACHINE.—Robert W. George, Boston, Mass.
113,044.—METHOD OF BANDING COMPRESSED WOOD.—Charles B. Gilman, Brooklyn, N. Y.
113,045.—MANUFACTURE OF SALT FROM BRINES.—Samuel D. Gilson, Syracuse, N. Y.
113,046.—CONSTRUCTION OF PIER-GLASS FRAMES AND CORNICES.—Daniel A. Hall and David Garrison, Philadelphia, Pa.
113,047.—CONFECTIONERY OR COCOANUT-CANDY.—H. N. Harbach and Theodore J. Harbach, Philadelphia, Pa.
113,048, antedated March 24, 1871.—TURNING-LATHE.—Pierre J. Hardy, New York, N. Y.
113,049, antedated March 16, 1871.—COACH-PAINTER'S EASEL.—D. R. Harris, South New Berlin, N. Y.
113,050.—WHEEL FOR VEHICLES.—James Harris, San Francisco, Cal.
113,051.—MOUSE-TRAP.—Hubert C. Hart, Unionville, Conn.
113,052, antedated March 11, 1871.—TUBULAR STEAM-GENERATOR.—James M. Hicks. New York, N. Y.
113,053.—REVOLVING FIRE-ARM.—Samuel S. Hopkins, Norwich, Conn., assignor to "The Hopkins & Allen Manufacturing Company," same place.
113,054.—VENTILATOR FOR HATS.—Henry A. House, Bridgeport, Conn.
113,055.—DENTAL PLATE FROM PYROXYLINE.—Isaiah S. Hyatt, John W. Hyatt, Jr., and Jesse A. Perkins, Albany, N. Y., assignors to "Albany Dental Plate Company," same place.
113,056.—REFRIGERATOR AND WATER-COOLER.—Anthony Iske, Lancaster, Pa., assignor to Daniel H. Lintner, same place.
113,057.—SAWING-MACHINE.—Pierson Jacobus, Romulus, N. Y.
113,058.—FORMER FOR BASKETS.—Horace C. Jones, Dowagiac, Mich.
113,059.—STAVE-BASKET.—Horace C. Jones, Dowagiac, Mich.
113,060.—ADJUSTABLE SEAT FOR VEHICLES.—Richard E. Jones, Goldsborough, N. C.
113,061.—POLICE-BATON.—Charles Kast, Williamsport, Pa.
113,062.—SKATE.—David Kerr and Asa E. Hovey, San Francisco, Cal.
113,063.—MEAT-BISCUIT.—Alex. Kirkwood, Toronto, Canada.
113,064.—WASHING-MACHINE.—Edwin Knock, Vermont, Ill.
113,065.—CHECK-REIN HOOK.—Alexander Ladd, St. Lawrence, N. Y.
113,066.—COMBINED HAY-RAKE AND TEDDER.—Charles La Dow, South Galway, N. Y.
113,067.—PHOTOGRAPHIC CAMERA.—William A. Leggo, Montreal, Canada.
113,068.—STEAMING-APPARATUS.—Otto Lehmann, Columbus city, Iowa.
113,069.—STEAM AND WATER-PRESSURE REGULATOR.—Nathaniel C. Locke, Salem, Mass.
113,070.—SASH-HOLDER FOR RAILROAD-CARS.—A. Loeffelholz and Anthon Prier, Milwaukee, Wis.
113,071.—MACHINE FOR CUTTING VENEERING INTO STRIPS.—G. W. Manton. Fredonia, N. Y.
113,072.—MACHINE FOR THREADING-BOLTS.—Henry Martin, Louisville, Ky.
113,073.—PIANO.—Frederick Mathushek, New York, N. Y.
113,074.—PIANO-FORTE ACTION.—Frederick Mathushek, New York, N. Y.
113,075.—CHISEL FOR MORTISING-MACHINES.—Edgar McConnell, Sharon, Pa.
113,076.—SEPARATOR FOR THRASHING-MACHINES.—Curtis Miller, Clay township, (Lincoln Post Office,) Pa., assignor to himself and J. R. Rogers.
113,077.—FOLDING-CHAIR.—George Miller and Phillip Hannah, Rochester, N. Y., assignors to themselves and John Gorton, Jr., same place.
113,078.—MACHINE FOR TURNING AXLES.—Arthur F. Moore, Florence, Ind.
113,079.—MAKING FLOUR.—George Motley, Rochester, N. Y., assignor to himself and Jirah B. Mosely, same place.
113,080.—CATARRHAL DOUCHE.—Richard M. Moylt, New York, N. Y.
113,081.—GANG-PLOW.—John Murray, Silveyville, Cal.
113,082, antedated March 15, 1871.—BURGLAR-ALARM.—John T. Mygatt and John Downing, Binghamton, N. Y.
113,083.—COMPOSITION-FUEL.—Jotham Newton, Providence, R. I.
113,084.—BEE-HIVE.—Philip Nicolle, Lindsay, Canada.
113,085.—GRINDING MILL FOR ORES.—Jacob S. Niswander, Oakland, Cal.
113,086.—COOKING-STOVE.—Daniel Eldon Paris, Troy, N. Y.
113,087.—REVERSIBLE-SETTEE.—Robert H. Paton, New York, N. Y.
113,088.—HORSE-POWER.—Thomas D. Pennington, Forsyth, Ga., assignor to himself and R. G. Anderson, same place.
113,089.—CHURN.—George S. Perfater, Camp Point, Ill.
113,090.—ELECTROPLATING LETTERS AND NUMBERS ON METALLIC PLATES FOR SIGNS, &c.—John J. Pratt, New York, N. Y.
113,091.—SHOE-BRAKE FOR WAGONS.—Abraham Quinn, Brooklyn, N. Y.
113,092.—RUNNING-GEAR FOR CARRIAGES.—John Rancevan, Carthage, Ohio.
113,093.—BUTTON-HOLE CLAMP AND GUIDE.—Loyal Reding, Norwalk, Ohio, assignor to N. S. C. Perkins and M. P. Smith, same place.
113,094, antedated March 16, 1871.—MACHINE FOR PULLING FLAX.—Benjamin M. Reeves, Franklin, Pa.
113,095, antedated March 27, 1871.—CHUCK FOR LATHES.—John Rich, Painesville, Ohio.
113,096.—REVERSIBLE KNOB-LATCH.—Henry M. Ritter, Cincinnati, Ohio.
113,097.—REVERSIBLE KNOB-LATCH.—Henry M. Ritter, Cincinnati, Ohio.
113,098.—PLOW.—Hamilton Roney, Dayton, Ohio.
113,099.—SOLDERING SPIRAL BANDS.—Elijah H. Russell, Providence, R. I.
113,100.—SUSPENSION TOILET-MIRROR.—Ranson T. Sargent, Norwich, Vt.
113,101.—CUT-OFF ATTACHMENT TO SLIDE-VALVES.—T. Sault, New Haven, Conn.
113,102.—ANTI-FRICTION BALANCED-VALVE.—William Siefert, New York, N. Y., assignor to himself and Matthew T. Kane, same place.
113,103.—BABY-TENDER.—Samuel M. Simmonds, Lynn, Mass.
113,104.—LAMP-BURNER.—George L. Smith, Bridgeport, Conn., assignor to the Bridgeport Brass Company.
113,105.—PORTABLE FENCE.—Frank Sproul, Doniphan, Kansas.
113,106.—CLOTHES-DRIER.—August Stechschult, Glendorf, Ohio.
113,107.—ROCK-DRILL.—James M. Stephenson, Pendleton, Ind.
113,108.—AUTOMATIC WATER-SPOUT CUT-OFF.—Edward Stewart, Fort Madison, Iowa.
113,109.—CULTIVATOR.—Michael Stoll, Conestoga township, Pa., assignor to himself and Jacob G. Peters, same place.
113,110.—BOILER-FURNACE.—Uriah B. Stribling, Madison, Ind.
113,111.—SHEET-METAL FRUIT-CAN.—Columbus F. Sturgis, Buena Vista, Ala.
113,112.—RAILWAY-SWITCH LOCK.—Archibald Thomson, St. Louis, Mo.
113,113.—APPARATUS FOR TRANSMITTING POWER TO MACHINERY.—William H. [illegible] phia, Pa.

113,114.—MANUFACTURE OF COMPOSITION-ROLLER BUSHINGS.—F. B. Torrey, Bath, Me.
113,115.—FORCING LIQUIDS.—Jacob Van Norman, Easton, Pa.
113,116.—AXLE AND AXLE-BOX FOR VEHICLES.—E. Von Jeinsen and James M. McDonald, San Francisco, Cal.
113,117.—CANDLE-MOLDING MACHINE.—Joseph Wales, New York, N. Y.
113,118.—WASHING-MACHINE.—George S. Walker, Erie, Pa., assignor to himself and Frank E. Adams, same place.
113,119.—MEN'S GAITER.—Edmund R. Ware, Worcester, Mass., assignor to William A. S. Smyth and Robert L. Smyth, same place.
113,120.—MEANS FOR DETECTING AND SIGNALING FIRES.—Wm. B. Watkins, Jersey City, N. J.
113,121.—HORSE-RAKE.—B. Webb, Unadilla Forks, N. Y.
113,122.—BUTTER-TUB.—C. H. White, Emmett township, Mich.
113,123.—SASH-HOLDER.—B. M. Whiting, San Francisco, Cal.
113,124.—TINTED GLASS FOR SPECTACLES.—Thos. A. Wilson, Reading, Pa.
113,125.—BEAN-HARVESTER.—Jacob A. Wood and Thos. Wood, Chemung, Ill.
113,126.—GRAPPLING-HOOK.—Elias Ziegler and Chas. Cable, Harmony, Pa.
113,127, antedated March 25, 1871.—COLORING AND STAINING MARBLE.—John Zengeler, Chicago, Ill
113,128.—SKIN UNDER-GARMENT.—John H. Andrus, New York, N. Y.
113,129.—CLOTHES-RACK.—Henry M. Andrus and Jehiel H. Cleaveland, North Bay, N. Y.
113,130.—WASHING-MACHINE.—Alfred M. Bailey, Middlefield, Conn., assignor to the Metropolitan Washing-Machine Company.
113,131.—CHECK-HOLDER.—Andrew A. Baker, Camden, N. J.
113,132.—DOUBLE-ACTING FORCE-PUMP.—Jerry Barney, Perry's Mills, N. Y.
113,133.—GRAIN-WEIGHING REGISTER.—William Henry Baxter, Brixton Hill, England.
113,134.—HARVESTER.—Jacob H. Beam, Springfield, Ill.
113,135.—SEWING-MACHINE CASTER.—Thomas T. Bishop and Henry J. Merret, Evansville, Ind.
113,136.—HARNESS SADDLE.—Valentin Borst, New York, N. Y.
113,137.—NOZZLE FOR OIL CANS.—Jabez A. Bostwick, New York, N. Y.
113,138.—COMPOSITION BURIAL CASE.—Frederic W. Brown, Albany, N. Y.
113,139.—SHOT-CHARGER.—George D. Capewell, George A. Capewell, and Joseph T. Capewell, Woodbury, Conn., assignors to George D. and George A. Capewell.
113,140.—TOP-ROLL FOR SPINNING, &C.—William A. Caswell, Providence, R. I., assignor to himself, Albert F. Allen, and William D. Hilton, same place.
113,141.—ROTARY HARROW.—John Francis Chase, Westbrook, Me.
113,142.—STOVE-LEG.—Thomas Jefferson Close, Philadelphia, Pa.
113,143, antedated March 24, 1871.—MARINE PROPELLER.—George B. Cocks, Cincinnati, Ohio.
113,144.—PUMP.—Nathan T. Coffin, Knightstown, Ind.
113,145.—GARDEN-BED BORDER.—Joseph Edgar Dickson and Seelye Richmond, Annapolis, Md.
113,146.—SASH-HOLDER.—Jacob J. Diehl, Harrisburg, Pa.
113,147.—CARBURETING-MACHINE.—Antoine Ernest Dupas and Arthur Barbarin, New Orleans, La.
113,148.—CULTIVATOR.—David Edwards, Marong, near Sandhurst, Australia.
113,149.—SHOE AND OVER-GAITER.—Thomas R. Evans, Philadelphia, Pa.
113,150.—CHIMNEY.—Alvan B. Ewing, Lewisburg, Tenn.
113,151.—MEDICAL COMPOUND FOR CURE OF SCROFULA, LIVER COMPLAINT, &C.—Philip Fay, Sr., Lacon, Ill.
113,152.—SPUR.—Henry Fellows, Bloomington, Ill.
113,153.—VALVE FOR OIL TANKS.—Daniel Fisher and William Cumming, Oil City, Pa.
113,154.—LIGHTNING-ROD.—David A. Foot and George S. Knapp, Winona, Minn.
113,155.—SPARK-ARRESTER FOR LOCOMOTIVES.—Benjamin P. Freeman and Pat. Payton, Macon, Ga.
113,156.—COFFEE-POT.—Daniel S. French, Montgomery, Ala.
113,157.—FEATHER-RENOVATOR.—Jonathan Garrett and Jonas E. Rauch, Selin's Grove, Pa.
113,158.—TREATING THE TIMBER OF OLD FIELD PINES.—James H. Gatling, Murfreesborough, N. C.
113,159.—COTTON-PICKER.—Williamson Goodwin and Sinclair D. G. Niles, Helena, Ark.
113,160.—CAR-COUPLING.—Stephen Gregory, Jonesville, Mich.
113,161.—HORSE-COLLAR.—Lyman Guinnip, Danville, Ill.
113,162.—WATER-METER.—Thomas C. Hargrave, Boston, Mass.
113,163, antedated March 21, 1871.—PROPELLER FOR VESSELS.—Calvin A. S. Harris, St. Louis, Mo.
113,164, antedated March 20, 1871.—MACHINE FOR FORMING CARRIAGE SPRINGS.—William Harty, Bridgeport, Conn.
113,165.—HORSE HAY-RAKE.—John F. Henkle, St. Louis, Mo.
113,166.—TORSION SPRING FOR CARS.—Benjamin Hershey, Erie, Pa.
113,167.—MACHINE FOR FORMING PIPE ELBOWS.—Charles Hoeller, Cincinnati, Ohio, assignor to himself and Henry S. Hoeller, same place.
113,168.—ANIMAL TRAP.—James William Fishback How, Douglas County, Oregon.
113,169.—LAND-ROLLER.—John T. Hudnet, Reaville, and Holloway W. Mathews, Frenchtown, N. J., assignors to J. W. Priestly & Co.
113,170.—COTTON-PICKER.—John Hughes, Newbern, N. C.
113,171.—HUB FOR WHEELS.—William Coale Johnson, Philadelphia, Pa.
113,172.—CHURN-DASHER.—Columbus Johnston, Clarksville, Mo.
113,173.—HORSESHOE-MACHINE.—William R. Justus, Pittsburg, Pa., assignor to Shoenberger & Co., same place.
113,174.—CORN-PICKING AND HUSKING-MACHINE.—Silas R. Kenyon, Greenville, R. I., assignor to himself and William D. Vernam, Elizabeth, N. J.
113,175.—HARVESTER-CUTTER.—William G. Kenyon, Wakefield, R. I.
113,176.—COMPOSITION FOR LUBRICATING JOURNALS.—Rudolph C. Klein, St. Louis, Mo.
113,177.—FASTENING FOR NECK-TIES.—A. Komp, New York, N. Y.
113,178.—VAPOR-BURNER.—William H. Lawrence, Baltimore, Md.
113,179.—GRINDING-MILL.—Edwin D. Little and Edgar C. Little, Shabbonas Grove, Ill.
113,180.—PEAT-MACHINE.—Yalmon Ludington, Fayette County, Pa.
113,181, antedated March 18, 1871.—SHADD-HOLDER FOR LAMPS.—James W Lyon, Brooklyn, N. Y.
113,182.—MACHINE FOR SCOURING NEEDLES.—Francis W. Mallett, New Haven, Conn.
113,183.—LAMP-BURNER.—Charles B. Mann, Baltimore, Md., assignor to himself and Stephen S. Mann, same place.
113,184.—SIEVE.—Robert J. Malin, Dallas City, Ill.
113,185.—BRICK-KILN.—James M. McCarthy, Canal Dover, Ohio.
113,186.—EARTH-CLOSET.—James Megratten, Wilmington, Del.
113,187.—BEE-HIVE.—John F. Methern and Solomon Young, Union City, Ind.
118,188.—VEGETABLE-CUTTER.—Francisque Monnet, New York, N. Y.
113,189.—MACHINE FOR STRIPPING AND CUTTING LEATHER.—John E. Coffin, Portland, and Charles E. Morrill and George F. Hall, Westbrook, Me.; Coffin and Hall assign to Charles E. Morrill.
113,190.—ROTARY-PLOW.—Joseph R. Morris, Houston, Texas.
113,191.—FURNACE FOR PRODUCING HYDROGEN AND TREATING ORES.—Joseph R. Morris, Houston, Texas.
113,192.—PRODUCING GAS FROM HYDRO-CARBONS.—Xavier Moussard, Paris, France.
113,193.—BUGGY-BRAKE.—Isaac Lamborn Myers, Ferguson Township, Pa.
113,194.—BREECH-LOADING FIRE-ARM.—Robert Nenninger, Newark, N. Y.
113,195.—SKIRT-BOARD.—John F. Nettleton, New Haven, Conn.
113,196.—MOLDED SADDLE-TREE AND COMPOSITION FOR THE SAME.—Ernst B. Newman, St. Louis, Mo., assignor to Newman Erb, same place.
113,197.—HOT-AIR FURNACE.—James R. Nichols, Boston, Mass.
113,198.—MEDICINE OR POWDER FOR HORSES, &C.—John Norcross, West Newton, Pa.
113,199.—OILER FOR LOOSE PULLEYS.—Stephen R. Norris, New York, N. Y.
113,200.—LUBRICATOR.—Thomas J. Nottingham, Cincinnati, Ohio.
113,201.—SEWING-MACHINE.—Charles O. Parmenter, Amherst, Mass.
113,202.—METHOD OF SCENE-SHIFTING FOR THEATRICAL AND ANALOGOUS PURPOSES.—John L. Peake, New York, N. Y.
113,203.—ROCK-DRILL.—George B. Phillips, Poughkeepsie, N. Y., assignor to himself, Adrian M. Cornell, and James B. Harbottle, same place.
113,204.—CLOTHES-DRIER.—Edward N. Porter, Morrisville, and Israel J. Currier, Wolcott, Vt.
113,205.—CORN-DRILL.—Benjamin W. Remy and Noah T. Remy, Brookville, Ind.
113,206.—CORN-PLOW.—Benjamin W. Remy and Noah T. Remy, Brookville, Ind.
113,207.—BEE-HIVE.—William Reynolds and Joseph V. Brooks, Lexington, Ill.
113,208.—CHLORIDIZING SILVER ORE.—Eugene N. Riotte, San Francisco, Cal., assignor of five-fourteenths interest to Charles A. Stetefeldt, same place, and five-fourteenths to John H. Boalt, Sandusky, Ohio.
113,209.—WARDROBE OR HAT-HOOK.—Charles Roe Scott, New York, N. Y.
113,210.—TREADLE.—Ai B. Shaw, Medford, Mass.
113,211.—PUNCH AND EYELETING-MACHINE.—Elijah Shaw, Milwaukee, Wis.
113,212.—FORK, HOE, &C.—Samuel Sheble, Philadelphia, Pa.
113,213, antedated March 22, 1871.—MACHINE FOR REPAIRING HOSE, &C.—Alfred Shedlock, New York, N. Y.
113,214.—STAVE-JOINTER.—John Sherman and William Marriott, Cleveland, Ohio.
118,215.—FASTENER FOR CARRIAGE CURTAINS, &C.—Samuel Shute, Jr., Richmond, Va.
113,216.—LOCOMOTIVE.—Albert S. Smith, Boston, Mass.
113,217.—SAW-MILL.—W. Dean Smith and Andrew J. Chase, Union, N. Y.
113,218.—WINDMILL.—Bradley W. Staton, Almena, Mich.
313,219.—GRAIN-DRIER.—William Stark and Joseph G. Fisher, Toledo, Ohio.
118,220.—HEATING-STOVE.—William Stark and Joseph G. Fisher, Toledo, Ohio.
112,221.—EXCAVATOR.—Barna T. Stowell, Quincy, Ill.
113,222.—FARMERS' BOILER.—Richard W. Thickins and David R. Sperry, Batavia, Ill.
113,223.—EXCAVATOR.—Jacob S. Thomas, Mifflintown, Pa.
113,224.—COMPOSITION FOR PRINTERS' INKING-ROLLERS.—Andrew Van Bibber, Cincinnati, Ohio.
113,225.—HARVESTER.—Joseph Van de Water, Whitewater, Wis., assignor to himself, George Esterly, and George W Esterly, same place.
113,226.—FLOUR-BOLT.—Thomas M. Walker, Bellefontaine, Ohio.
113,227.—WASHER AND WRINGER.—Paul Weatherbee, Port Washington, Ohio.
113,228.—COMPOSITION FOR TREATING IRON.—Samuel Weaver, Pottstown, Pa.
113,229.—BLOWER.—William W. Webb, Indianapolis, Ind..
113,230.—GLOVE.—William W. Whitaker, Gloversville, N. Y.
113,231.—FOLDING-BED.—Lewis Whitehead, Sr., Brooklyn, N. Y.
113,232.—CUT-OFF VALVE-GEAR.—Seth H. Whitmore, Decatur, Ill
113,233.—CORN-PLANTER.—Uriah T. Wilson, De So City, Miss.
113,234.—SULKY ATTACHMENT FOR PLOWS.—John Worrell and James H. Rynerson, Clayton, Ind.
113,235.—SULKY ATTACHMENT FOR PLOWS.—John Worrell and James H. Rynerson, Clayton, Ind.
113,236.—LIGHTNING ATTACHMENT FOR ALARM-CLOCKS.—Henry X. Wright, Memphis, Tenn.
113,237.—LIQUID MEASURE.—William M. Wright, Chambersburg, Pa., assignor to himself and Harrison Phoebus, Fortress Monroe, Va.

REISSUES.

4,308.—BREECH-LOADING FIRE-ARM.—Kiel W. Barkenov, Cornwall, assignor to himself and George W. Greene, New York, N. Y.—Patent No. 104,100, dated June 14, 1870.
4,309.—CULTIVATOR.—Theophilus Bertrand and Peter Sames, Rockford, Ill.—Patent No. 60,916, dated January 1, 1867.
4,310.—GRINDSTONE JOURNAL-BOX.—Thomas W. Brown, Boston, Mass., assignor, by mesne assignments, to Harbster Brothers & Co., Reading, Pa.—Patent No. 58,678, dated October 16, 1866.
4,311.—STEAM ROAD WAGON.—Charles W. Hermance, Schuylerville, N. Y.—Patent No. 111,644, dated February 7, 1871.
4,312.—MACHINE FOR OPENING COTTON.—William C. Jillson and Amos B. Palmer, Willimantic, Conn.—Patent No. 110,368, dated December 20, 1870.
4,313.—MUFF AND COLLAR-BOX.—James P. Jones, Bloomfield, N. J., assignor to Jason Crane, same place.—Patent No. 96,118, dated October 26, 1869.
4,314.—MANUFACTURE OF STEEL.—Solomon W. Kirk, Philadelphia, Pa., assignor of part interest to Henry Thomas, same place.—Patent No. 53,307, dated March 20, 1866.
4,315.—MACHINE FOR MAKING HORSE-SHOES.—The Howe Horse-shoe and Machine Company, New York, N. Y., assignee of Ozial A. Howe.—Patent No. 82,409, dated September 22, 1868.
4,316.—HOOP-SKIRT.—William H. Towers, Boston, Mass., assignor to the Vertical Hoop-Skirt Company, same place.—Patent No. 84,149, dated November 17, 1868.

DESIGNS.

4,732.—STONE-DRAG.—Joseph P. Adams and George Hyde, Whitney's Point, N. Y.
4,733.—TOY STEAM-ENGINE.—Alexander Buckman and John W. Huffington, Brooklyn, N. Y.
4,734.—CARPET-PATTERN.—George Holdsworth, Halifax, England, assignor to W. & I. Sloane, New York city.
4,735.—BED-QUILT.—Louis Kreuzberger, Philadelphia, Pa., assignor to Braner & Co., same place.
4,736.—SALT-CELLAR.—John B. Larner, Washington, D. C.
4,737.—CARPET-PATTERN.—William Mallinson, Halifax, England, assignor to W. & I. Sloane, New York city.
4,738.—CARPET-PATTERN.—Archibald McCallum, Halifax, England, assignor to W. & I. Sloane, New York city.
4,739.—CARPET-PATTERN.—Archibald McCallum, Halifax, England, assignor to W. & I. Sloane, New York city.
4,740.—CARPET-PATTERN.—Archibald McCallum, Halifax, England, assignor to W. & I. Sloane, New York city.
4,741.—CHAIR.—Henry Ocorr, Sheboygan, Wis.
4,742.—CHAIR.—Henry Ocorr, Sheboygan, Wis.
4,743.—TYPE.—Richard Smith, Philadelphia, Pa., assignor to Mackellar, Smiths & Jordan, same place.
4,744.—STATUARY.—Ames Van Wart, New York, N. Y.
4,745.—GLASS BOTTLE.—William R. Warner, Philadelphia, Pa., assignor to William R. Warner & Co., same place.

TRADE-MARKS.

207.—WHISKY.—John L. Bernecker, St. Louis, Mo.
208.—MEDICINE.—Henry H. Hay, Portland, Me.
209.—WHISKY.—Daniel V. B. Henarie, San Francisco, Cal.
210.—WHISKY.—E. Martin & Co., San Francisco, Cal.
211.—BITTERS.—Adam Orth, Milwaukee, Wis.
212.—SALVE.—O. M. Palmer, New York, N. Y.
213.—MINERAL WATER.—Saratoga Seltzer-Spring Company, Saratoga Springs, N. Y.
214.—TEA.—Williams, Blanchard & Co., San Francisco, Cal.

EXTENSIONS.

DAVID H. WHITTEMORE, of Worcester, Mass.—Letters Patent No. 15,668, dated February 17, 1857.

HERMAN E. DAVIDSON, of Gloucester, Mass., for himself and CHARLES H. DAVIDSON, deceased.—Letters Patent No. 16,956, dated March 31, 1857; reissue No. 1,940, dated April 25, 1865.

ALONZO M. GILES, Boston, Mass.—Letters Patent No. 16,830, dated March 17, 1857.

IMPORTANT TO INVENTORS.

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CHARLES ROGERS, Solicitor and Manager.

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final Government fee	20
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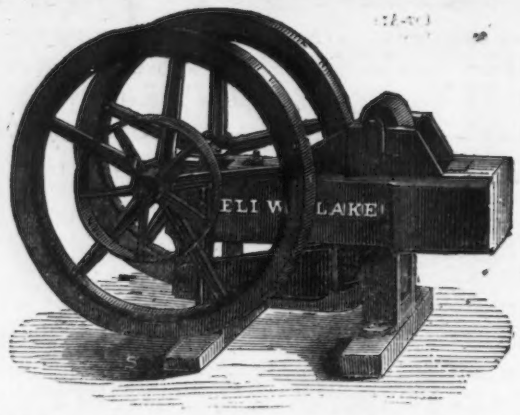

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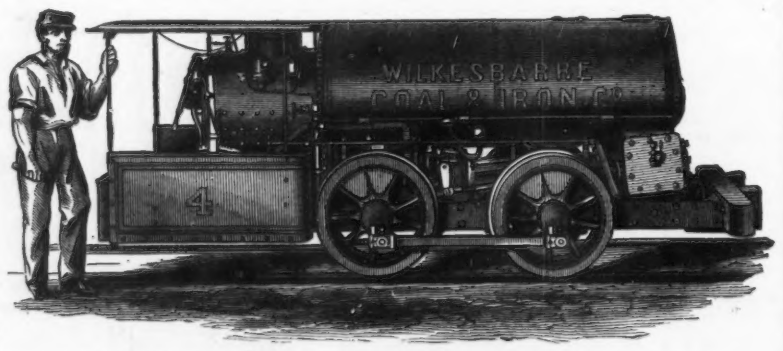

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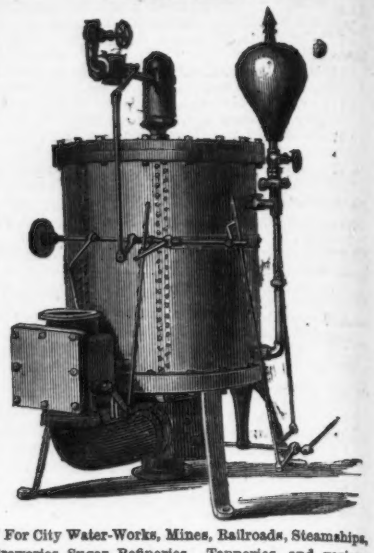

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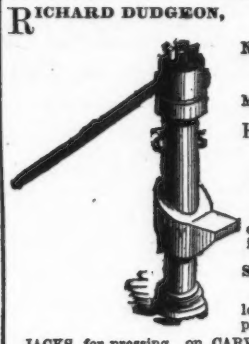

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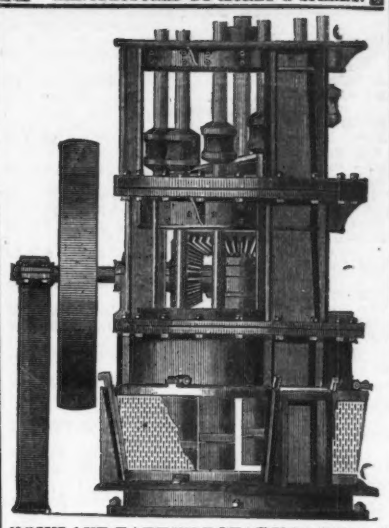

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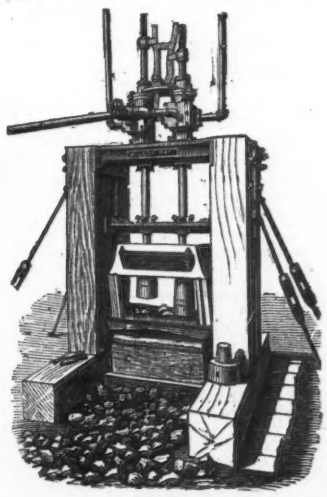

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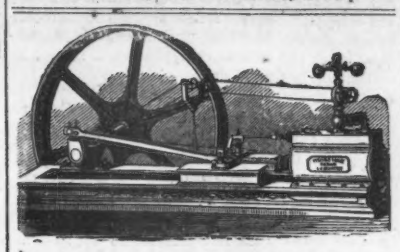

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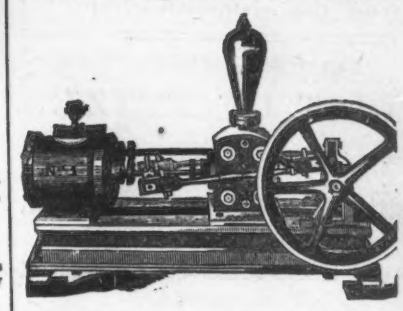

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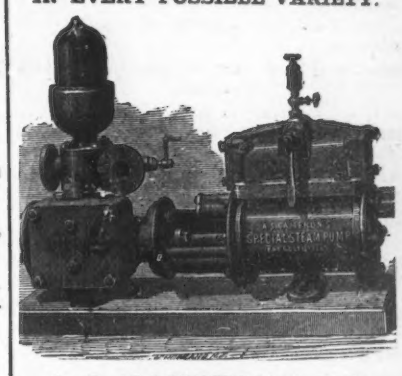

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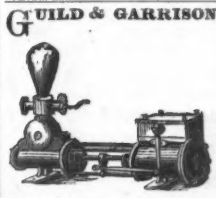

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UNPRECEDENTED

LIST OF PRIZES.

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THE

Manufacturer and Builder,

Offers to both

REGULAR AND VOLUNTEER CANVASSERS,

For cash subscriptions,

Princely Premiums for Great Efforts,

And

GENEROUS RETURNS FOR THE SMALLEST FAVORS.

Almost anything in the world, great or small, that any body wants, can be acquired by canvassing for the

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Select Descriptive List of Hundreds of Rich Premiums,

It is only necessary to write to Western & Co., Publishers, 37 Park Row, New York, describing the COVETED ARTICLE, and special terms will be made for obtaining it as a Prize for Suscriptions; in most cases, terms that are equivalent to GIVING THE CANVASSER

NEARLY ALL HE CAN COLLECT,

As will be seen by examining the List.

In these days, CAPITAL is necessary for establishing the enormous circulation required to make a first-class periodical like THE MANUFACTURER AND BUILDER profitable in spite of its gigantic expenses. Capital is necessary to pay for the best productions of the best writers, for the costly designs and engravings, for the fine, thick paper, and for the extra style of printing, that make THE MANUFACTURER AND BUILDER the type of a new era in American polytechnic journalism. Capital is above all necessary to PAY THE ARMY OF CANVASSERS employed in bringing the merits and benefits of this journal home to the intelligent millions of the American people.

OUR PLAN FOR

1871

IS

CAPITAL WITHOUT STINT

For these purposes, and

MAGNIFICENT PAY

To all who help us.

We desire to pay out the coming year not less than a Quarter of a Million of Dollars from our receipts and reserves, for the services of Volunteer Agents alone, in all the States, Territories, and Provinces of North America. Our paper challenges comparison with the best Journals of Arts and Engineering in the world. It is at the same time one of the cheapest publications ever issued from the press; and to all its attractions we now add a range of Premiums tantamount almost to a free gift of our paper, our labor, our earnings, for the year, for the sake of introducing THE MANUFACTURER AND BUILDER to myriads of readers, whose patronage in future years will recompense our present lavish outlay.

For these premiums are to be not only offered, but **paid**; not only paid, but paid **promptly**, to the letter and spirit of the description, and to the satisfaction of all. Every premium is of the best and most desirable kind we can select, and from manufacturers whose names are a guarantee of excellence.

The premiums range from twenty-five cents to twelve hundred dollars in value—the prices annexed are in no case exaggerated, but the actual cash value invariably—so that one who aims at a large premium will not lose his labor even if obliged by any cause to suspend his efforts, because it is never too late to decide what premium to select, and no list is too small to earn a valuable prize, or rather a choice of many valuable prizes.

Every class of persons can share in this profitable employment, at times, in ways and in places suited to their circumstances, and with rewards adapted to their different desires.

You never know what you can do until you Try.

Thousands of persons, of both sexes, once straitened and perplexed to get a living, have suddenly found out that they had the gift to **get rich by canvassing!** Study the nature of the business, and particularly *human nature*; study the arguments and inducements for subscription to THE MANUFACTURER AND BUILDER, lay your plans well, and get every body to help you, and then let nothing discourage or stop you.

In the following table is given the price of each article and the number of subscribers required to get it free, at $1 50 a year; also at the club rate of $1 a year. The descriptions of a few articles are given in the fourth column, the balance is given in our *Descriptive Premium Sheet*, which will be sent on application to those who contemplate getting up clubs.

List of Premiums and Terms for Vol. III., 1871.

A Free Field for Everybody. No Competition.

No.	Names of Premium Articles.	Price of Premium.	Number of Subscribers required at $1 50	Number of Subscribers required at $1
	FROM PATTERSON & BROS.			
1	Tool-Chest	$45 00	60	199
2	Case Mathematical Instruments	9 00	18	65
3	Case Mathematical Instruments	15 00	22	75
4	Pocket Knife	1 50	4	21
5	Pocket Knife	2 00	5	22
6	Pocket Knife	2 50	6	25
7	Lady's Pocket Knife	2 00	5	22
8	One dozen Knives and Forks	14 00	21	70
9	One dozen Knives and Forks	18 50	27	90
10	One dozen Knives and Forks	22 00	33	110
11	One dozen Knives and Forks	25 50	39	124
12	Carver and Fork	5 00	13	37
13	Fluted Sharpening Steel	2 50	6	25
	FROM HALL, ELTON & CO.'S PLATE.			
14	One dozen Tea-spoons, medallion	5 75	14	40
15	One dozen Table-spoons, medallion	12 00	19	65
16	One dozen Table Forks, medallion	12 00	19	65
17	Butter-Knife, medallion, solid	1 00	4	
18	Soup-Ladle, medallion	5 75	14	40
19	Ice or Water-Pitcher, No. 3	17 00	26	80
20	Pocket Fruit-Knife, No. 12	2 00	5	22
21	Revolving Butter-Cooler, No. 80	8 00	16	52
22	Cake-Basket, No. 1867	10 00	18	58
23	Caster, 6 bottles, chased, No. 2039	9 25	18	54
24	Fruit-Basket, No. 200	13 50	21	75
25	Child's Cup, No. 041	2 75	6	25
26	Knife, Fork, and Spoon, child's set, morocco case	3 00	8	30
27	One dozen Napkin-Rings, medallion	9 00	17	54
28	Tea Set, gold lined, No. 1822	48 00	52	180
29	Tea Set, No. 1866	36 00	45	135
	FROM COLBY BROS. & CO.			
30	Knife-Cleaner	75	2	
	FROM MARIE, TODD & CO.			
31	Gold Pen and Pencil, rubber case	8 00	15	45
32	Gold Pen and Pencil, rubber case	6 75	13	37
33	Gold Pen, silver or gold holder, in box	4 25	9	32
34	Gold Pen, extension gold case, in box	20 00	29	90
35	Lady's Gold Pen, ivory holder, in box	2 75	6	25
	FROM HENRY RUSSELL & CO.			
36	Downer Mineral Oil Lamp, No. 1956	4 75	10	35
37	Downer Mineral Oil Lamp, No. 1960	9 25	17	56
	FROM C. F. A. HEINRICH.			
38	St. Germain Student Lamp, largest size	8 25	15	45
	FROM FAIRBANKS & CO.			
39	Family Scales	14 00	21	70
	FROM COLBY BROS. & CO.			
40	Clothes-Wringer	7 50	10	35
	FROM ALEXANDER M. LESLEY.			
41	Refrigerator, the Zero, No. 38	38 00	42	142
42	Cooler, the Newport, No. 1	12 00	15	45
43	Hot-Air Coal Furnace, the Gothic, No. 9	125 00	135	450
44	Hot-Air Wood Furnace, Gothic, No. 10	150 00	162	525
	FROM THE STANLEY RULE & LEVEL CO.			
45	Iron Smoothing-Plane, Bailey's patent	5 00	13	37
46	Iron Smoothing-Plane, Bailey's patent	6 50	14	42
47	Iron Jack-Plane, Bailey's patent	7 50	15	47
48	Iron Fore-Plane, Bailey's patent	9 00	17	55
49	Iron Jointer-Plane, Bailey's patent	10 00	18	58
50	Wood Smoothing-Plane, Bailey's patent	3 00	8	30
51	Wood Fore-plane, Bailey's patent	4 50	10	35
52	Wood Jointer-Plane, Bailey's patent	75	12	36
53	Wood Jointer-Plane, Bailey's patent	50	14	40
	FROM POST & GODDARD.			
54	Machinists' Hand-Taps	17 60	25	75
55	Machinists' Hand-Taps	52 80	65	220
56	Machinists' Hand-Taps (your choice)			
57	Screw-Plates and Dies, size A	5 00	12	37
58	Screw-Plates and Dies, size B	8 00	15	45
59	Screw-Plates and Dies, size C	10 00	18	58
60	Screw-Plates and Dies, size D	13 00	20	70
61	Tap-Wrenches, size A	3 00	7	25
62	Tap-Wrenches, size B	4 00	9	30
63	Tap-Wrenches, size C	5 00	12	37
64	Set of 11 Taper Shank-Twist Drills, No. 1	19 75	29	90
65	Set of 29 Drills, straight shank, mounted, No. 9	12 00	18	60
66	Set of 60 Drills, steel wire gauge from 1 to 60, No. 12	8 00	15	45
67	Set of 21 Taper-Shank Drills, No. 3	44 00	58	175
68	Set of 9 Bit-Stock Drills, 1-16 to ½ in.	2 80	6	25
69	Self-Centering Drill-Chucks, Beach's patent, for jewelers, No. 0	10 00	18	58
70	Self-Centering Drill-Chucks, Beach's patent, for drilling, No. 0	7 00	14	40
71	Self-Centering Drill-Chucks, Beach's patent, 0 to 3-16, No. 1	6 00	13	38
72	Self-Centering Drill-Chucks, Beach's patent, 1 to 60 S. W. E., No. IX	7 00	14	40
73	Self-Centering Drill-Chucks, Beach's patent, 0 to ½, No. 3	14 00	23	77
74	Drill-Grinding Machine, No. 1	10 00	18	58
75	Drill-Grinding Machine, No. 2	20 00	30	95
76	Auger-Bits, your choice of 4 sets	—	—	—
	FROM L. W. POND.			
77	Foot-Lathe, No. 1	50 00	65	204
78	Foot-Lathe, No. 2	30 90	47	124
	FROM COLBY BROS. & CO.			
79	Miniature Steam-Engine and Boiler	1 36	5	23
	FROM RUSSELL & SPEIR.			
80	Steam-Engine (1 H. P.) and Boiler	300 00	310	1125
81	Steam-Engine (3 H. P.) and Boiler	600 00	640	2250
82	Steam-Engine (5 H. P.) and Boiler	800 00	858	3000
83	Steam-Engine (10 H. P.) and Boiler	1200 00	1285	4500
84	Steam-Pump, C. B. Hardick's, No. 0	120 00	155	540
85	Steam-Pump, Cameron & Co.'s, No. 1	150 00	192	675
86	Steam-Pump, Cameron & Co.'s, No. 2	200 00	257	900
87	American Submerged Pump	12 00	19	65
	FROM GEORGE TALLCOT.			
88	Turbine Water-Wheel, Reynold's, 12 in.	105 00	125	360
89	Turbine Water-Wheel, Reynold's, 24 in.	226 50	270	800
90	Turbine Water-Wheel, Reynold's, 36 in.	384 50	460	1350
91	Rotary Blower, Root's patent No. 1	$50 00	70	275
92	Rotary Blower, Root's patent, No. 2	80 00	105	420
93	Portable Forge, Root's patent, No. 1	48 00	65	260
94	Portable Forge, Root's patent, No. 3	80 00	105	420
	FROM THE AMERICAN SAW CO.			
95	Circular Saw	125 00	135	473
96	Cross-Cut Saw	6 50	14	42
	FROM A. P. & M. STEPHENS.			
97	Labor-Saving Vise, 2-in. jaw	4 00	9	32
98	Labor-Saving Vise, 4½-in. jaw	12 00	28	58
	FROM THE STANLEY RULE & LEVEL CO.			
99	Boxwood two-foot Rule	2 50	6	25
100	Silver-Plated Triangular Drawing-Scale	6 00	16	52
101	Pocket Sheet-Metal Gauge	5 00	13	37
102	Arkansas Oil-Stone	1 75	5	22
103	Arkansas Oil-Stone, mahogany case	3 25	8	30
104	Gear or Cog-Wheel Calculating-Rule	4 00	12	36
	WESTERN & COMPANY'S AGENCY.			
105	Preparing and Filing a Caveat	25 00	28	80
106	Application for a Patent	30to40	35	100
107	Application for Patent and first Government fee	46to56	50	150
108	Application for Patent and all Government fees	66to76	75	250
	FROM J. W. HUTCHINSON.			
109	English Breech-loading double-barrel Gun	100 00	110	350
110	English Muzzle-loading double-barrel Gun	75 00	85	250
111	Breech-loading Rifle, the Allen	30 00	46	150
112	Revolver, Smith & Wesson's, No. 1½	12 50	19	65
113	Revolver, Smith & Wesson's, No. 2	15 00	22	75
	FROM MASON & HAMLIN.			
114	Melodeon, portable, No. 1, 4 octave	50 00	66	200
115	Melodeon, resonant, style G, 5 octave	170 00	146	510
116	Pipe-Organ, church use, style No. 29	675 00	579	2000
	FROM J. S. & C. ODELL.			
117	Pipe-Organ	500 00	430	1500
118	Pipe-Organ	700 00	600	2100
119	Bradbury Square Piano-Forte, No. 4	650 00	430	1500
120	Steinway's No. 1 Grand Piano	1200 00	860	3000
	THE AMERICAN WATCH CO., WALTHAM, MASS.			
121	Silver Watch	20 00	32	100
122	Silver Watch	35 50	48	142
123	Gold Watch	50 00	65	200
124	Lady's Gold Watch	100 00	110	350
	FROM THE UNITED STATES WATCH CO.			
125	Silver Watch	40 00	50	150
126	Silver Watch	66 00	75	275
127	Gold Watch	100 00	100	300
128	Silver Watch	104 00	104	312
129	A Sewing Machine (your choice)	65 00	65	200
	FROM MCALLISTER.			
130	Microscope and 48 objects	10 00	14	40
	FROM COLBY BROS. & CO.			
131	Velocipede for Boys	16 00	16	52
	FROM MCALLISTER.			
132	Magic-Lantern, No. 433	20 00	30	95
	FROM H. THOMPSON.			
133	An Easy Chair			
	FROM D. APPLETON & CO.			
134	New American Cyclopædia, 16 vols	80 00	80	213
	FROM G. & C. MERRIAM.			
135	Webster's Unabridged Pictorial Dictionary	12 00	15	45
136	Webster's National Pictorial Dictionary	6 00	10	35
	FROM WESTERN & COMPANY.			
137	One back vol. Manufacturer and Builder, unbound, post-paid	1 75	6	25
138	Two back volumes Manufacturer and Builder, unbound, post-paid	3 50	11	37
139	One back vol. Manufacturer and Builder, bound, post-paid	2 50	9	32
140	Two back volumes Manufacturer and Builder, bound, post-paid	5 00	18	58
141	Cover for binding the Manufacturer and Builder, post-paid	60	3	21
142	A $10 Library (your choice from list in special sheet), *All paid through by mail or express.*	10 00	18	58
143	A $15 Library, "	15 00	24	85
144	A $20 Library, "	20 00	31	106
145	A $25 Library, "	25 00	38	125
146	A $30 Library, "	30 00	44	144
147	A $35 Library, "	35 00	50	162
148	A $40 Library, "	40 00	56	177
149	A $45 Library, "	45 00	62	192
150	A $50 Library, "	50 00	68	207
151	A $60 Library, "	60 00	80	237
152	A $75 Library, "	75 00	100	282
153	A $100 Library, "	100 00	125	360
154	A choice of good Books (see terms in another column)			
155	A choice of convenient Book-Cases (see special sheet)			
156	A choice of popular Music (see terms in special sheet)			
157	A choice of Games and Toys, (see terms in special sheet)			

We have taken especial pains to select in making up our price list the NEWEST and very BEST articles. No charge will be made for boxing or packing any article on our list. The Premiums, Nos. **4** to **7** inclusive, **31** to **35** inclusive, 75 **99, 101, 105** to **108** inclusive, **121** to **128** inclusive, **137** to **141** inclusive, **154, 156, 157**, will each be delivered FREE of charge by mail or express (at the Post-office or express office nearest recipient) to any place in the United States or Territories. The other articles cost the recipient only the freight after leaving the manufactory of each, by any conveyance specified.

As an aid to those who engage upon large clubs, we will count subscriptions by *one* individual for 1869, 1870, and 1871, as *three* subscribers toward a premium. Every *new* subscriber should have the work from the beginning. Bound volumes may be counted in the same way—each as one subscriber—except, of course, when they are obtained as a premium.

Do not fail to note the following Points:

1. All subscribers sent by one person count, though from one or a dozen different post-offices. But

2. State with each name or list of names sent that it is for a premium.

3. Send the names as fast as obtained, that the subscribers may begin to receive the paper at once. You can have any time, from one to six months, to fill up your list.

4. Send the exact money with each list of names, so that there may be no confusion of money accounts.

5. Old and new subscribers all count in premium clubs, but a portion, at least, should be new names; it is partly to get these that we offer premiums to canvassers.

6. Specimen numbers, cards, and show-bills will be supplied free, as needed by canvassers; but they should be used carefully and economically, as they are very costly.

7. Remit money in Checks on New York banks or bankers, payable to order of WESTERN & COMPANY, or send Post-Office Money Orders. If neither of these is obtainable, Register Money Letters, affixing stamps both for the postage and registry; put in the money and seal the letter in the presence of the post-master, and take his receipt for it. Money sent in any of the above ways is at our risk.

DESCRIPTIVE LIST OF PREMIUMS.

Every Premium in the annexed list is described in the December MANUFACTURER AND BUILDER, *and also in a* **Special Descriptive Sheet,** *which will be sent* **free** *to every one desiring it. We have room here for the following only:*

No. 1—Chest of Good Tools.—We are able, through the special favor of Messrs. Patterson Brothers, of 27 Park Row, to offer chests of the very finest quality of tools, of kinds and prices named below. Similar tools could be purchased for half the money; but these are all A No. 1, for practical use, and worth a dozen common articles. For this we have the guarantee of Messrs. Patterson, which is amply sufficient for us, and for all who know them. Any of these tools may be ordered of them. We make up only a single premium, which contains a full assortment for all common purposes. The tools are of regular size, and but few additions would be required for a journeyman carpenter. The assortment we offer is as follows: 1 tool-chest, $8; 1 jack-plane, $1 75; 1 smooth-plane, $1 50; 1 fore-plane, $2 25; 1 handsaw, 22 in., $1 75; 1 compass saw, 10 in., 50c.; compass, 6 in., 37c.; 1 adze-eye hammer, No. 4, $1 25; 1 hatchet, No. 2, 90c.; 1 draw-knife, 7 in., $1 12; 1 try-square, 6 in., 70c.; 1 bevel, 8 in., 75c.; 1 chalk-line and spool, 30c.; 1 mallet, 30c.; 1 pair of pliers, (steel,) 5 in., 60c.; 1 pair of calipers, 4 in., 35c.; 1 brace, No. 2, $2 25; 1 auger-bit, ea., ¼ in., 30c.; ½ in., 32c.; ¾ in., 45c.; 1 in., 60c.; 1 centre-bit, ea., ¾ in., 21c.; ¾ in., 23c.; 1 in., 25c.; 1¼ in., 35c.; 1½ in., 40c.; 6 gimlet-bits, assorted, 90c.; 3 gimlet-bits, assorted, 33c.; 1 screw-driver bit, 25c.; 1 flat countersink, 25c.; rose, do., 25c.; snail, do,, 25c.; 1 octagon reamer, 30c.; 1 taper-bit, 30c.; 1 screw-driver in handle, ea., 3 in., 30c.; 6 in., 50c.; 1 gouge in handle, ea., ½ in., 50c.; 1 in., 70c.; 1 chisel in handle, ea., ¼ in., 30c.; ½ in., 35c.; ¾ in., 40c.; 1 in., 50c.; 1¼ in., 60c.; 1 framing-chisel, ea., ¾ in., $1; 1 in., $1 10; 1¼ in., $1 20; 1 auger, ea., ¾ in., 70c.; 1 in., 80c.; 1¼ in., 90c.; 1 set brad-awls in handles, $1 35; 1 rule, 2 feet, 25c.; 1 saw file, ea., 4 in., 14c.; 5 in., 17c.; 1 flat bastard file, 8 in., 30c.; 1 wood-rasp, 50c.; 1 soldering copper, 60c.; solder nails, etc., $1 25;=**$45 00.**

Nos. 2, 3—Mathematical Instruments for Draughting, Drawing, Etc.—Very convenient not only for architects and mechanics, but for boys and girls. These are neatly fitted in beautiful rose-wood cases, having dividers with flexible joints; and points, semi-circles, pencil and penholders, rulers, etc., etc. All the pieces in No. 2 are finished in brass and steel; those in No. 3 are German-silver and steel. The pieces are the same in each, but No. 3 is of extra beauty and workmanship. 18 subscribers at $1 50 each secures No. 2, and 22 at $1 50 each, No. 3.

Nos. 4, 5, 6, 7—Pocket Knives.—Here's for the boys and girls. These premiums are among the most pleasing and useful that we have ever offered. Every boy, and girl too, wants a pocket knife. We give them an opportunity to obtain a most valuable one for merely a little effort. These knives are from Messrs. Patterson Bros. No. 4 is a neat, substantial knife, with three blades and buck-horn handle. No. 5 is a still finer article, with four blades and buck-horn handle. No. 6 is an elegant knife, with four blades and shell handle. No. 7 is a lady's pocket-knife, a beautiful article, with four blades and shell handle.

Nos. 8, 9, 10, 11, 12, 13—American Table Cutlery.—We are glad to be able to offer really good articles of American manufacture, such as are competing successfully with the best foreign goods. ***Messrs. Patterson Bros., 27 Park Row,*** who supply us with these articles, are also importers of English goods. They recommend these knives, manufactured by the ***Meriden Cutlery Co.,*** as equal to any cutlery in the market, and their recommendation is a guarantee wherever they are known. We offer four kinds knives, and three sizes of each kind. No. 8 have rubber handles, which are actually boiling-water-proof, so that, if they were accidentally to remain in it for several minutes, or even hours, they would not be injured. The blades are of the best steel, and warranted Dessert size, with forks, sold at $14. For 23 subscribers at $1 50, or 78 at $1, we will give either the medium size or the table size, sold at $15 50. No. 9 have ivory handles, are selected with great care, have steel blades, and are beautiful goods. Dessert size, with forks, sold at $18 50. For 31 subscribers, at $1 50, or 100 at $1, we will send the medium size, sold at $20 50. For 34 at $1 50, or 112 at $1, we will send the table size, sold at $22 50. No. 10 are made of solid steel, and are triple-plated all over with pure silver, which will wear for a long time, while the knife is actually indestructible by ordinary use. Dessert size, with forks, sold at $22. For 37 subscribers, at $1 50, or 118 at $1, we will give the medium size, sold at $24 50. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25, No. 11 have steel blades, triple-plated with silver, and larger ivory handles, and are really splendid goods. Dessert size, with forks, sold at $25 50. For 42 subscribers, at $1 50, or 128 at $1, we will give the medium size, sold at $28. For 45 subscribers at $1 50, or 143 at $1, we will give the table size sold at $30 50. The forks, which accompany these premiums, Nos. 8, 9, 10, are made of genuine albata, and warranted double-plated with coin-silver. The forks with No. 11 are warranted triple-plated with coin-silver. These forks are also furnished to us by Messrs. Patterson Bros. The carving-knife and fork, and fluted steel, are made by

the Meriden Cutlery Co., with the best ivory balanced handles.

Nos. 14 to 29—Silverware for the Table.—What would become of elegance and refinement in the furnishing of homes if the ladies (God bless them!) had not such an amiable passion for endlessly beautifying everything around them? Ever since Eve first set out the fruit of Paradise on its broad leaves to entertain the angel guests of Adam, it has been the province of her lovely daughters to spread the social board with attractions still more tempting to the eye than to the palate. What, that becomes a woman, will not a woman do to make her table shine? We condole with them that their means are not always equal to their good taste, and propose that henceforth no lady shall lack a lustrous silver tea-set, or other piece of similar elegance, unless she chooses to. Look at the following premiums, all of the celebrated manufacture of Messrs. HALL, ELTON, & Co., 36 Park Row, New York; No. 28 is silver-plated, gold-lined, beautifully chased **Tea Set** of six pieces, consisting of a coffee-pot, two teapots, a creamer, a sugar-bowl, and a slop-bowl. The style of this set is very neat, new and elegant. Messrs. Hall, Elton & Co, warrant these goods to be their best triple plate. This is a very desirable premium. No. 29 is a tea-set with same number of pieces, triple-plated, plain, new style.

Nos. 31, 32, 33, 34, 35—GOLD PENS, Rubber Mounted with Ever-Pointed Pencils—Pens in Gold and Silver Holders—Pens and Pencils in Extension Cases.—No. 31 has a gold-mounted rubber case, with pencil, and a No. 4 gold pen, manufactured by MABIE, TODD & Co., 180 Broadway, New York. This and the next, No. 32, are, we think, really the best things of the kind manufactured. The fact that hard rubber is used, shows that the gold for the mountings, etc., is of the finest quality, as rubber, on account of the sulphur contained in it, can not be mounted with any other without tarnishing. When closed, the pencil No. 31 is only 5 inches long, (No. 32, 3¼ inches,) but it opens to a length of 5¾ inches. The price for the holder and pencil of No. 31 is $6, pen $2; and of No. 32, or smaller size, $5 for the case, and $1 75 for the pen. Fifteen subscribers will give you the former, or gentleman's size, and 13 the latter, or lady's size. No. 33 is a No. 6 gold pen, with silver or gold-plated holder with an ebony handle—a very neat, desirable business pen. By describing the kind of pen you prefer, we can probably select one that will suit your hand perfectly. We send these by mail, in a neat turkey morocco box, lined with velvet, in which they can be kept, protected from injury. No. 34 is a large pen, in a fine extension case, round or fluted, and richly engraved. The gold is 14 carats fine. These pens, which are nicely put up in boxes, are a very beautiful thing for a present. Price $20, and sent, postage paid, to any address, upon receipt of 29 subscribers at $1 50 each. No. 35 is a lady's gold pen, with ivory holder. Price, $2 75. This is indeed a very neat and beautiful pen for ladies' use. We send it, postpaid, by mail, inclosed in a handsome velvet-lined morocco box, for 6 subscribers.

No. 38—The Celebrated St. Germain or German Student's Lamp.—as it is sometimes called. This lamp is made and furnished to us by C. F. A. HINRICHS. It scarcely needs eulogium, being the standard thing in our leading colleges, both among students and professors. They reject gas, even where it is most plentiful and convenient, and save their much-worked eyes by the motionless pure white light for which this lamp is so remarkable. No other artificial illumination approaches so nearly to the still colorless sunlight. The secret is in the scientific adaptation of burner and chimney to produce that perfection of draught by which absolute combustion is attained without vibration. The porcelain shade softens the light most agreeably. The lamp slides on a vertical standard, and is adjusted by a set-screw at any desirable elevation to accommodate the work or the eyes. The reservoir is elevated above and at a short distance from the burner, (communicating by a pipe,) so that the oil is always cool and out of reach of flame. The reservoir can be taken out of its telescopic socket, and carried away to another room and filled and returned, without putting out the light. The lamp will be a treasure worth no little trouble to obtain to any one who needs strong light, or who values eye-sight, economy, neatness, pure air, and freedom from trouble and annoyance with lamps; as in all these points it is without a peer. The price of these lamps is $8, with 25 cents for packing. The mineral sperm oil can be had from most respectable dealers, or ordered in packages of any size (1 gallon upward) from Messrs. HENRY RUSSELL & Co., 38 Park Place, New-York.

No. 39—Family Scales.—These scales combining the advantages of counter and platform scales, are peculiarly adapted to household purposes. They weigh from ½ ounce to 240 lbs. They have a scoop or pan for weighing flour, sugar, and other house stores, and a platform for heavier articles, and are just such an apparatus as is needed for in-door or out-door use, occupying less than two feet square. These scales are manufactured by the well-known FAIRBANKS & Co., No. 252 Broadway New York, whose weighing apparatus has long ranked as the standard in all parts of the country. Send to them for circulars, if desired.

Nos. 45.53—Bailey's Patent Planes.—To those who have used these planes and know their value, it is but small praise to say that they are superior to any others made. They are so far ahead of any others that there can be no comparison between them. They are self-adjusting in every respect. Both the wood and iron planes are entirely independent in themselves, requiring neither hammer, screw-driver, nor wrench to replace or adjust the cutter, which is held firmly in place and can be instantly released by use of the cam and its thumb-piece. The cutter is adjusted by simply turning a thumb-screw under the bed-piece upon which the plane-iron rests. By this the cutter can be adjusted to any thickness of shaving. The Stanley Rule and Level Co., 55 Chambers Street, New York, warrant these planes to be of the best stock and finish. The various numbers and sizes of these planes which we offer give carpenters, mechanics, and others desiring them, an opportunity to get a complete set of either the wood or iron planes as premiums. The smooth planes, of which we offer two sizes, are 5½ inches long, 1¾ inch cutter; and 8 inches long, 1¾ inch cutter.

Jack plane..	.....14 in. long,	2	in. cutter.	
Fore "	.....18 " "	2¾	" "	} Iron.
Jointer "	.....22 " "	2¾	" "	

In the wood planes the lengths and widths of cutter embrace all sizes made. Forty-four subscribers at $.50 each, or 141 subscribers at $1 each, will get a complete set of the wood-planes. Sixty-nine subscribers at $1.50 will get a complete set of the iron planes, which will last a life-time. If larger sizes than those given are wanted, a few extra subscriptions will be required, according to the difference in the price.

Nos. 54-76—Machinists' Tools.—This series of premiums, consisting of machinists' tools, etc., has been selected and put up at the suggestion of several practical men with whom we have consulted in regard to the subject. These gentlemen, who have a practical knowledge of the tools, and of the requirements of all who have any thing to do with the working of metals, give their unqualified approval of the tools we have selected. This list of premiums has been made so extensive that every man who has any industrial operrtions to carry on will find some tool or tools absolutely necessary to him. By sending us clubs of subscribers to THE MANUFACTURER AND BUILDER these tools may be obtained by the smallest possible amount of labor. Of the qualities of these tools, in point of finish, we know them to be the best in the market—the best, without challenge. When a man has a set of any of them in his tool-chest, he knows he has the means of producing work equal to any that can be done. We obtain these tools from the general agents, Messrs. POST & GODDARD, 109 Liberty Street, New York.

No. 77—Foot-Lathe No. 1.—Of these useful articles we offer two kinds. No. 1 is perfectly adapted for most kinds of turning in wood or metals; also drilling, boring, polishing, sawing, etc. It seems to be the size desired by most people. This is proved by the great numbers of them sold. This lathe takes a piece between centres 19 inches long and 6¼ inches wide in diameter. It weighs 200 pounds. It is fitted with two pointed centres, one spur-centre, face-plate turned and polished, two rests, one 9 and the other three inches long; also centre key and wrench combined, which fits the screw heads in different parts of the lathe. The balance-wheel weighs 45 pounds, is turned true, and is polished. It has two sizes for change of speed. This size of lathe has a great many extra parts made for it, so that whenever they are wanted they can be obtained. This is a very valuable point, as in buying other machines of the kinds only such things as happen to fit can be used, and they are not always to be found when wanted. The Rev. JOHN TODD, D.D., speaking of lathes, says in regard to these, "For price, for finish, for beauty and workmanship, I have never seen any American lathe so desirable. Of the No. 1 he says: "Nobody can own the lathe without daily gratitude." We procure these lathes through Mr. LUCIUS W. POND, 98 Liberty street, the well-known manufacturer of machinists' tools. Few people can obtain one of these lathes more easily than by obtaining 65 subscribers for THE MANUFACTURER AND BUILDER, for which we ship this premium, without any additional charge for boxing. The regular price is $50. We include leather belt 8 feet long, which costs 90 cents in the price given in the table.

No. 78—Foot Lathe, No. 2.—Our subscribers are frequently asking for second-hand lathes, saying at the same time that such a one would answer their purpose, and probably come cheaper. There are many others who do not care for so complete a lathe as No. 1. The No. 2, we think, will answer this demand. It is made of cheaper materials, but in the same style as lathe No. 1. The frame is of wood, with curved legs, which give it a neat and attractive appearance. It is painted and ornamented in the best style. The bed is made with iron slides three feet long. Will take a piece between centres 21 inchhes long and 6¼ inches in diameter. It has an iron pulley like No. 1. The spindle runs accurately. The face-plate takes off, and the centres are fitted to tapering sockets. Tailstock spindle traverses with a left-hand screw. Everything is well fitted and finished. The balance-whee is the same pattern as for lathe No. 1, and is turned true. The lathe, with face-plate, long and short T rests, two pointed centres, spur-centre, and wrench, packed for transportation, costs $30. For this we also include the leather belt, 8 feet long, which is used on the driving wheel. We box this lathe and deliver it on the cars for a club of 47 subscribers at $1 50 each, or 124 at $1. The twist-drills and chucks—premiums 65, 66, and 69 to 73—especially the smaller sizes, are just the things for these lathes. The chucks, No. Ox, 2 and 3, cost $2 extra for fitting in the lathe. Those desiring further information in regard to the premium may send to WESTERN & Co., 37 Park Row, New York, for an illustrated pamphlet.

No. 79—The Dollar Steam-Engine.—This is a real working steam-engine and boiler, which runs half an hour, or until its fill of water is evaporated, by means of a small spirit-lamp, which forms a part of it. It can not explode or get out of order. A most instructive as well as entertaining toy. Sent, prepaid, for 5 subscribers at $1 50. It is manufactured by COLBY BROTHERS & Co.

Nos. 80, 81, 82, 83—Compact and Powerful Portable Steam-Engine and Boiler.—BAXTER'S patent is acknowledged by many experienced engineers to be the most perfect combination, of standard principles exclusively, and thorough workmanship, ever made in a portable engine. At the same time such is its compactness and the scale and system on which it is manufactured, (by the Colt Armory, at Hartford, Ct.,) that it is afforded at the lowest price ever known for the same (actual) power. It is made by machine tools constructed expresaly for it, of standard interchangeable parts throughout, like the celebrated American watches. Consequently we are able to make it one of our most attractive and valuable premiums. Besides, it is warranted to consume less fuel per horse-power than any other engine. This is in consequence, partly, of the improved arrangement of the boiler and the cylinder being entirely let into the steam-space, to save room and heat. The one-horse engine and boiler (which, like the others, will run above, not below rated power) stands but five feet high, over all, by two feet in diameter. This is premium No. 80, costs $300, and can be had for 320 subscribers at $1 50 each, or 1125 at $1 each. The five-horse engine and boiler stands 6½ feet high by 3 feet in diameter, costs $500, and can be had for 858 subscribers at $1 50 each. The ten-horse engine costs $1200, and will run a good sized manufactory. There is now no reason why any body should be without a first-class steam-engine, especially as these engines are so simple, snug, safe, and economical of fuel that they can be run in any apartment by the fire required to warm it, and by and person of common intelligence, and will be received from the factory in perfect readiness for use. For running small lathes, drills, etc., circular and scroll saws, printing-presses, corn-huskers, cider-mills, fanning-mills, feed-mills, cotton-gins and hullers, cheese-presses, churns, pumps, washing-machines, sewing-machines, rotary blowers for forges and other purposes, etc., the smallest of these engines will be found thoroughly effective, and as little incnmbrance and trouble as a kitchen stove. For business, however, we recommend to try for one of ample rather than of bare sufficiency.

Nos. 84, 85, and 86—Steam-Pumps.—These steam-pumps are of the best class and quality, economical in the use of steam, and capable of being applied in various ways. No. 84 is one of Hardick's manufacture, which took the first prize at the Fair of the American Institute a year ago. Nos. 85 and 86 are two sizes of the celebrated Cameron pump. Nos. 1 and 2. The first has a steam cylinder 4½ by 7 inches, and its capacity of ordinary speed is 15 gallons per minute, and costs $150. Size No. 2 has a steam cylinder 6 inches in diameter, with 8-inch stroke. It costs $200, and is capable at ordinary speed of delivering 30 gallons of water per minute. These pumps are remarkable for their compactness, simplicity, and durability. The valves are large and not liable to become choked up. By simply removing the bonnet, access can be had to them for inspection or repair,

Nos. 105 to 108—To Procure a Patent without Money.—We have met with many having valuable inventions, which inventors are anxious to get patented, but are unable to afford the expense, and consequently fail to secure the profits which a patent might produce. To such as are in this position, we make the following liberal offer: No. 105—We will prepare an application for a patent, attend to its passage through the Patent Office, and pay all government fees and incidental expenses attending the same, for any inventor presenting a patentable invention, who will get up a club of seventy-five subscribers for THE MANUFACTURER AND BUILDER for one year at $1,50 each, or 250 at $1 each, and send us the money by post-office order. If this application should be rejected, they may send us an additional list of thirty subscribers at $1.50 each, and the subscription money for the same, on receipt of which we will prepare and prosecute a second application, paying all government fees and incidental expenses. No. 107—For a list of fifty subscribers at $1.50 each, or 150 at $1 each, with the cash accompanying it, we will prepare an application, attend to its passage through the office, and pay the government fee ($15), the applicant paying the second government fee of $20. No. 106—For a list of thirty-five subscribers at $1.50, sent in the same way, we will prepare and prosecute an application, the applicant paying the government fee. No. 105—for twenty-eight subscribers at $1.50 each, or eighty at $1 each, we will prepare and file a caveat, furnish the necessary drawings, (which we also furnish in all the above cases), and pay all government fees. All cases placed in our hands under these arrangements will receive our best attention, equally with those for which our fees have been paid in cash, and will be appealed to the Board of Examiners-in-Chief if necessary, the applicant paying the government fee of $10 on such appeal. If the inventor has no model to accompany his application, he may procure additional subscribers, the premium on which (see cash rates) will enable him to pay for the model. A club of 100 names has been obtained in a single establishment where from 150 to 200 hands are employed. A village of 500 inhabitants will take this number readily.

No. 129—Sewing Machines.—Your choice! A $65 machine for 65 subscribers, at $1.50 each.—It makes no difference to us which machine we send, or whether it is selected at first or at the last moment. No charge for boxing the machines; they go safely as freight. For circulars, giving full particulars in regard to style of machines, fixtures, etc., as well as instructions, send to **Grover & Baker Manufacturing Co.**, 495 Broadway, New York; **Florence Sewing Machine Co.**, 505 Broadway, New York; **Wilcox & Gibbs Sewing Machine Co.**, 658 Broadway, New York; **Singer Sewing Machine Co.**, 458 Broadway, New York.

Nos. 137, 138—Volumes of the Manufacturer and Builder.—The unbound volumes of THE MANUFACTURER AND BUILDER consist of a set of numbers for a year, each separate in its own paper cover. These volumes amount to a valuable Library on all matters pertaining to the Industrial Arts, and contain more varied information on manufacturing, building, and mechanical subjects than can be obtained in books costing three times as much. The price of the volumes unbound is $1.50 each, at the office, or $1.75 if sent by mail, as they must be post-paid. They are profusely illustrated, the engravings used in them having alone cost thousands of dollars. For ordinary use, the sets of numbers unbound will answer quite well.

Nos. 139, 140—Bound Volumes of the Manufacturer and Builder.—*New* subscribers almost invariably desire to secure the back numbers of THE MANUFACTURER AND BUILDER from its commencement. Some desire them bound in our uniform style, while others prefer to get the loose numbers and have them bound to suit their own tastes. *Our* binding is very neat, and being done in large quantities at one time, is furnished at a *very cheap* rate. It is moreover very handsome, being of cloth, with gilt title and back, sides embossed and ornamented with a neat architectural device stamped in gold. The price of the volumes is $2.50 each, sent post-paid.

No. 141—Covers for Binding the Manufacturer and Builder.—These are described in premium 139, 140. Now ready for 1869 and 1870. Be careful to state *which year* you require. Any country binder will insert the year's numbers in one of these covers at a moderate cost. Price, 50 cents; sent, *postpaid*, on receipt of three subscribers at $1,50 for each cover.

Nos. 142 to 154—Good Libraries.—In these premiums we offer a choice of books for manufacturers, mechanics, artisans, builders and others. The person entitled to any one of the premiums 142 to 153, may select any books desired from the list published in our Special Premium Sheet, to the amount of the premiums, and the books will be forwarded, post or express paid. $25 or $50 worth of books pertaining to the industrial arts will give the boys new ideas, set them to thinking and observing, and thus enable them to make their heads help their hands. Any good book will, in the end, be of far more value to a youth than to have an extra hundred dollars on coming to manhood. ☞ Let the mechanics of a neighborhood unite their efforts, and through these premiums get an industrial library for general use.

No. 154—General Book Premium.—Any one sending twenty-five or more names may select books from our list to the amount of ten cents for each subscriber sent at $1; or thirty cents for each name sent at $1.20; or sixty cents for each name at $1.50. *This offer is only for clubs of twenty-five or more. The books will be sent by mail or express, prepaid through by us.*

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" " "	15	"	6 00	
" " "	20	"	10 00	
" " "	30	"	15 50	$1 50
" " "	40	"	25 00	4 00
" " "	50	"	32 50	7 50
" " "	75	"	48 75	11 25
" " "	100	"	65 00	15 00
" " "	200	"	140 00	40 00
" " "	500	"	350 00	100 00
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" "	20	" "	30..	1 00	" "	
" "	30	" "	40..	95	" "	
" "	40	" "	50..	90	" "	
" "	50	" "	200..	85	" "	
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" "	500	" "	1000..	80	" "	
" "	1000	and over.....		80	" "	

The Profits of the Cash Business, it will be seen by the above tables, are large and accrue rapidly. Every experienced canvasser knows that it is far easier to obtain 4 subscribers to a paper like THE MANUFACTURER AND BUILDER at $1 50 each than to get 1 subscriber to a high-priced magazine, costing $6. This is more strikingly evident when the fact is taken into consideration that our paper, costing only $1 50, is ACTUALLY SUPERIOR IN EVERY RESPECT TO ANY THING OF THE KIND IN THE COUNTRY COSTING TWICE THAT SUM.

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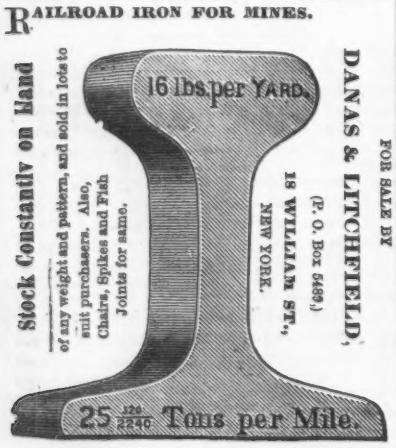
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PATENTS—No. 76,499, April 7, 1868.. No. 96,465, Nov. 2, 1869.
No. 93,113, July 20, 1869 No. 106,606, Aug. 23, 1870. Address GEORGE N. MOWBRAY,
No. 94,969, Sept. 21, 1869 No. 106,607, Aug. 23, 1870. NORTH ADAMS, MASS.
[Feb. 21, 3m.]

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UNITED STATES DISTRICT COURT
In the matter of ABRAHAM BININGER and ABRAHAM B. CLARK, Bankrupts.

Notice is hereby given that the undersigned, as Assignee of the above-named bankrupts, will sell at public auction, at the Merchants' Exchange Salesrooms, No. 111 Broadway, in the City of New York, on the 17th day of May, 1871, at 12 o'clock, at noon, by E. H. Ludlow & Co., Auctioneers, two parcels of land adjoining each other, situate partly in Spottsylvania county, Virginia, and partly in Orange county, Virginia, containing together seven hundred and seven acres of land, known as the Vaucluse Gold Mining property, together with the mines, minerals, metals, and metallic substances, buildings, improvements, fixtures, and appurtenances thereto belonging, including two steam engines, and all other mining machinery and utensils used in the mining operations now, or recently, carried on at the said Vaucluse mine, etc.

The sale will be subject to confirmation by the Court.

Detailed description of the property, and an inventory of the improvements, fixtures, etc., may be had upon application to the undersigned, or to his attorneys, Messrs. BANGS, SEDGWICK & NORTH, No. 137 Broadway, or to the Auctioneers.

New York, March 16, 1871.
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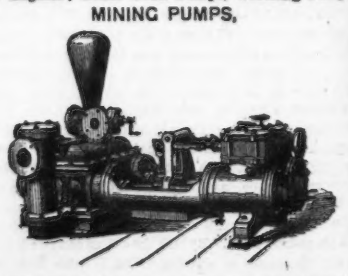

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